Pests

AND THEIR CONTROL

1944

JUNE

VOL. 12 NO. 6

ORGAN OF THE PEST CONTROL INDUSTRY

Exterminators
Fumigators
Termite Control Operators
Entomologists
Insecticide and Supply Mfgrs.

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Pests

and Their CONTROL

Exterminators, Fumigators, Termite Control Operators, Entomologists, Insecticide and Supply Manufacturers

COOPERATING WITH NATIONAL PEST CONTROL ASSOCIATION

AL COSSETTA, *Editor*
D. E. RECK, *Associate Editor*

MAX ROSENTHAL, *National Advertising Rep.*
126 Lexington Ave., N. Y. City, Phone Mu. 4-9000

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For further details, communicate with
WILLIAM O. BUETTNER, Secretary
3019 Fort Hamilton Parkway **Brooklyn, New York**

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EDITORIAL

New Service Name Suggested

ROT INFECTIONS or beetle infestations are often found when termite inspections are made. Since neither, strictly speaking, comes within the purview of a termite inspection report, Robert Hackley, of Palo Alto, Calif., feels it would be helpful if a more inclusive term were adopted. He suggests "TIMBER INSPECTION."

There are times, he indicates, when termite inspections may prove a source of embarrassment to the operator, especially if rot or beetles are found when a sale of property is involved. Despite the obvious disadvantages of doing so, the reputable operator feels constrained to include such findings in his termite inspection report.

Not necessarily wedded to the term, "TIMBER INSPECTION," Mr. Hackley invites the reader to submit his own, just so long as it is descriptive and does not consist of more than two words, preferably. The important thing, however, is that a suitable term be adopted, used, and the public educated as to its significance.

Mayors, Councilmen, Health Officers and Citizens All Show Interest in Rats

SPRING CLEANING is now in order and many cities and communities throughout the United States are waging war against rats. A specific example recently brought to our attention indicates that the city of Cincinnati is instituting a rat control program under the heading of "Clean Up Week" to be held for one week during the month of May. . . Posters portraying dead rats as blown up from original photographs of city dump control jobs will be featured in store windows throughout the city. In other words, the rat is being brought into the limelight where people can view him and know of his poisonous nature so that he may be promptly killed and eradicated before he has had too much opportunity to continue his damaging and destructive ways as well as spreading disease.

In connection with the above we wish to relate an item of news which appeared in the New York Tribune during the week of April 17th. A matron of the city of New York entered the confines of New York's famous Central Park and actually found rats scurrying across a children's playground and scavenging food in the form of peanuts which was intended for pigeons, birds, squirrels and other forms of park denizens. Can you picture this appalling sight in a city as large as New York, and one that spends millions of dollars in the upkeep of its fine parks and yet overlooks an infestation which actually threatens the health of its growing children while they are at play? . . . You no doubt know that the parasitic flea which infests the rat has been known to spread Typhus Fever, Bubonic Plague, Rat Bite Fever, Spirochetal Jaundice, Rabies, Trichinosis and other diseases.

Following the above line of thought describing the boldness of rodents in general, you can no doubt visualize the activity of unmolested rats as they ravish food plants, candy factories, grocery warehouses, restaurants and other food establishments which cannot be serviced every day. Unquestionably, the damage is tremendous as well as the ever present menace of the spread of disease during war times when much of people's attention is centered on the production activity of our country in both feeding the home front as well as the Armed Forces abroad.

Therefore, we ask the Pest Control Industry "What are you doing in your own home town, municipality and city in controlling rodent infestation?" "Are you permitting your city to be over-run by rats?" "Are you establishing or endeavoring to institute a clean-up week?" In your special position as a Pest Control Operator and as a soldier of the home front, you can be highly instrumental in instituting such a program.

—*Fumigation News.*

PCO QUIZ—No. 4

FOR THE PAST three months we have offered true and false questions. Beginning this issue we start a series of **multiple choice questions.** You are to check the correct answer. Score yourselves 4 points for each correct answer. Consider yourself above average if you score 80, and average if you score 64. Check the correct answer on page 31.

1. A sow bug belongs to the class (1).....Crustacea, (2).....Arachnida, (3).....Diplopoda, (4).....Chilopoda, (5).....Hexapoda.
2. Adult spiders have (1).....six, (2).....eight, (3).....ten, (4).....twenty legs.
3. Adult insects have (1.....six, (2).....eight, (3).....ten, (4).....twenty legs.
4. Maggots have (1).....no, (2).....six, (3).....eight, (4).....ten legs.
5. Dog ticks are most closely related to (1).....insects, (2).....centipedes, (3).....sowbugs, (4).....spiders, (5).....millipedes.
6. Adult insects have (1).....two, (2).....three, (3).....four, (4).....five body regions.
7. The thief ant **(Solenopsis molesta)** and Pharaoh's ant **(Monomorium pharaonis)** are very much alike but they can be distinguished by the fact that Pharaoh's ant has (1).....one, (2).....two, (3).....three, (4).....four, (5).....five segments in the club of its antennae.
8. There are about (1).....50,000, (2).....60,000, (3).....70,000, (4).....80,000, (5).....90,000 kinds of insects known in the United States.
9. The larvae of a carpet beetle may be distinguished from that of a clothes moth by the fact that the carpet beetle larva has (1).....no, (2).....four, (3).....six, (4).....ten, 5 .....twelve legs on its abdomen.
10. The closest relative of termites among the following is: (1).....true ants, (2).....bedbugs, (3).....cockroaches, (4).....lice, (5).....book lice or mold fleas.
11. More of the 200 common household pests belong to the order (1).....Thysanura, (2).....Lepidoptera, (3).....Diptera, (4).....Hemiptera, (5).....Coleoptera, than to any other.
12. The largest of these insects is (1).....bedbug, (2).....springtail, (3).....meal worm, (4).....clothes moth adult, (5).....the termite.

The more common household insects belong to the following 11 orders: Coleoptera, Collembola, Corrodentia, Diptera, Hemiptera, Hymenoptera, Isoptera, Lepidoptera, Orthoptera, Siphonaptera, Thysanura. In the space to the right of the name of the following insects, write the name of the order to which it belongs.

13. Bedbug .....
14. American cockroach .....
15. Oriental rat flea .....
16. Confused flour beetle .....
17. Silver fish .....
18. Termite .....
19. Pavement ant .....
20. Book louse .....

How are you on scientific names? Besides being of great assistance in looking up literature, a knowledge of scientific names will mark you as a scholar, but not necessarily as a gentleman. Below on the left are the names of five important household insects and on the right are the scientific names of 10 insects. Put the number of the correct scientific name to the left of the common name of the insect.

21. .....Bedbug
22. .....Buffalo or common carpet beetle
23. .....Casemaking clothes moth
24. .....German cockroach
25. .....Housefly

1. **Aedes aegyptii**
2. **Anthrenus scrophulariae**
3. **Blatella germanica**
4. **Blatta orientalis**
5. **Cimex lectularius**
6. **Lepisma saccharina**
7. **Musca domestica**
8. **Pediculus humanus**
9. **Pulex irritans**
10. **Tinea pellionella**

"Pest Control Features The News"

RAT CONTROL and control of insects, destructive to health and property, spotlight the spate of recent articles in the nation's press. Two and a half years of war have made binocular-clear the prime importance of vigorous, continuous and scientific pest control—measures advocated even pre-Pearl Harbor—to their credit be it said—by the kindred professions of entomology and pest control. Reviews in brief follow:

☆ ☆ ☆

Quick, Henry, the DDT! by George H. Copeland, Liberty (April 8)

The cootie and all his insect pals are on the run in this man's war, thanks to new, deadly chemical weapons such as DDT, methyl bromide and pyrethrum, reports Mr. Copeland, who also describes manner of their use by the Army, including the aerosol or "cold smoke" method of insecticide application. Red squill in rat control receives favorable mention by the author, as do some unnamed insect repellents.

☆ ☆ ☆

Orlando Morning Sentinel, Orlando, Fla. (April 13)

Warning that the rat is a menace to the war effort and will also be one in the post-war period, the "Sentinel" underscores County Health Officer Rice's plea that the entire population cooperate in a statewide rat control project. It is poor cost accounting, the editorial notes, for the businessman to skimp on such essential rat control measures as rat-proofing, etc., because of the expense involved, since the cost to "maintain" rats over a period is much greater than it is to rat-proof.

☆ ☆ ☆

The Case Against the Flea, by J. D. Ratcliff, Collier's (April 15)

"With typhus becoming a national problem, every flea on every one of our 250,000,000 or more rats is a potential menace to health and life," says Mr. Ratcliff, who is convinced, therefore, that rat control is a job we can't afford to neglect. Discovery of American typhus, as a disease, its causes, its startling growth, making it a Grade A health problem, are detailed by the author.

"To a large extent," he says, "the problem of typhus is a problem of rats. Get rid of the rats and you get rid of typhus. This was demonstrated in 1934," Mr. Ratcliff points out, "when the old CWA put on an anti-rat campaign, destroying 7,000,000 rats in the south. Typhus took the only appreciable drop it has ever taken as a result," he asserts. "Still, this campaign had little permanent value, due to excessive fertility of the rat. To control rats—and typhus—" he concludes, "sustained effort is necessary."

Mr. Ratcliff then outlines a rat-eradication program suggested by Dr. Clifford R. Eskey to a number of southern cities and towns, particularly Orangeburg, S. C., a community where 30 cases of typhus had appeared. A veteran rat fighter of the U. S. Public Health Service, with many years of field experience, both here and abroad, Dr. Eskey included as an integral part of his program the employment of PCOs and extensive rat-proofing among other facilities.

Summarizing, Mr. Ratcliff states: "A rat-eradication program looks like one of the most promising programs for making jobs in the post-war era. Such a plan would have a double-barreled effect: It would save millions of dollars in rat damage, and it would keep a tight control on a pressing disease problem."

☆ ☆ ☆

Now We Can Lick Typhus, by Allen Raymond, The Saturday Evening Post (April 22)

How our Army doctors are winning the battle in Italy against typhus, a foe that has killed more men than all the weapons of war, is recounted in most interesting fashion in this article. Mass delousing of Naples' population, together with extensive use of an effective vaccine, the troops themselves having been immunized with it previously, minimized a serious problem that might very easily have gotten out of hand, according to the author.

☆ ☆ ☆

Buffalo News, Buffalo, N. Y. (April 28)

This article discusses elimination of one of the greatest obstacles to success of the anti-rat campaign, the lack of the regular 22-to-24 guage, metal-covered garbage containers. Dr. James W. Johnston, Jr., director of the Buffalo Rat Control Division, the article states, has, therefore, made formal application to the War Production Board to allocate more heavy-duty garbage cans to that city, since "the so-called victory cans which are available are so light you can kick your foot through them. They don't last." Favorable action on this request by the Office of Civilian Requirement is a good prospect, the article indicates.

☆ ☆ ☆

Here's Good News! Coming: Freedom from Insect Pests, by Alfred H. Sinks. The Reader's Digest (May), condensed from Popular Science Monthly (June, '44).

Apropos the task of freeing man from the dangers and discomforts caused by insects, the author makes the rather startling statement that there has been more progress in the past year than in the preceding half-century. Progress, he predicts, in the next few years may be even more startling. The future potentialities of the pyrethrin aerosol bomb, paradichlorobenzene and DDT, in particular, are discussed. Of the last-mentioned the article includes a reprint from "Better Homes and Garden," which follows: "DDT was first synthesized 70 years ago by a German chemist, but he never realized what a good thing he had. Nor, apparently, did the Swiss firm, Geigy, Inc., which patented it as a moth killer in 1939. Geigy never exploited it.

"In 1942 when the Surgeon General of the U. S. Army and the Department of Agriculture were desperately hunting better insecticides, they tested a lone pound of this Geigy moth killer which U. S. agents had slipped out of Switzerland. By May, 1943, Du Pont was manufacturing it in a new half-million-dollar plant. The Army has since flown it directly to Naples, Cairo and the South Pacific.

"Louse powders taken from German prisoners are definitely inferior to DDT. Prisoners have to be deloused when they come in. Yet there is little doubt that the German general staff now knows about DDT: the Germans have probably captured Allied prisoners who have been carrying the two-ounce DDT cans. But by the time Germany can work out production headaches, it may be too late to be useful in the war."

Protection Of Buildings From Termite Damage

(*With Special Reference to War-time Conditions*)

By NEELY TURNER, *Conn. Agr. Expt. Sta., New Haven, Conn.*

Editor's Note: The following is a condensation and slight revision of Mr. Turner's talk at the Eastern Pest Control Operators Conference, January, 1944, held at Massachusetts State College, Amherst, Mass.

Introduction

THE PROTECTION of buildings from termite damage is essentially a problem in building maintenance. This applies both to construction of new buildings and treatment of infested buildings. In general the methods used are much more analogous to the methods of keeping a building from deteriorating from rot or weathering than to the methods in common use for the control of insect pests. For instance, the weathering of wood is prevented by covering the wood with a protective layer of pigments, metals and plastics known as paint. Fire is prevented by proper construction of chimneys and heating plants and of electrical wiring, rather than by ignoring these items and depending on a sprinkler system.

This being the case, the relation of protection of buildings from termite damage to war-time conditions can be evaluated on the basis of building maintenance. This, in turn, appears to be a matter of getting along as best we can with the materials and labor available. Stated in other terms, it means patching and fixing and improvising until materials and labor are available for more complete repairs. In many cases it may also mean allowing the buildings to deteriorate much more rapidly than under normal conditions. This could be discussed at some length and with emphasis on priorities, essential use and all the other red tape apparently necessary for the conduct of a modern war. However, such a discussion could hardly lead to any definite conclusions and will therefore be omitted.

Biological Background

The control of any insect pest or prevention of damage by it is usually based on the biology of the pest. Termites have been studied carefully, and there is enough information on their life history and habits to enable us to apply prevention and control intelligently. Fortunately only subterranean species **(Reticulitermes floripes Kol)** is found in the northeastern states and this discussion will be confined to this type.

The principal biological factors affecting the application of control measures are as follows:

(1) **The colony** is not a compact unit, but may be spread over a relatively large area with several reproductive centers connected by a network of runways. Colony location may be changed with changes in temperature, moisture and food supply.

(2) **Moisture** must be available in the form of moist soil or wood. Termites require relatively large amounts of moisture to keep the humidity in the runways at a high level.

(3) **The food** of termites is any cellulose-bearing material—usually wood or wood products.

(4) **Temperature** has a great deal to do with termite activity. Observations indicate that more damage is done to heated than to unheated buildings. Further, in one location the presence of a central heating plant with many underground steam lines has created "semi-tropical" conditions resulting in very heavy damage to unprotected buildings.

(5) **Grooming**, the habit of obtaining exudations from the bodies of termites, is common. By this means poisonous dusts are carried through a colony of dry-wood termites. In some cases termites will eat weaker members in their own colony, further aiding the spread of poisons from one insect to another.

(6) **The tube-building** habits of termites are very important. Shelter tubes may be constructed over impenetrable objects, such as masonry and untreated or even treated wood. It should be added that termites apparently construct very few shelter tubes **up over foundations** in the northeastern states. Most of the tubes seen on foundations were obviously constructed down from infested wood to the ground.

Control

According to Metcalf and Flint, insect control "includes everything that makes life hard for insects and tends to kill them and prevent their increase or spread over the world." Direct control of termites is very difficult. The distribution and location of the colonies is such that direct application of either contact insecticides or soil fumigants cannot be expected to eliminate the colonies. A brief discussion of direct methods is in order, however.

Baits work very well for many species of ants which, like termites, live socially in colonies. Unfortunately no material more attractive to termites than wood has been found. Until such an attractant is available, baits offer little chance of killing a substantial proportion of a colony.

Dusts, particularly Paris Green and similar stomach poisons, have been found very effective for dry-wood termites. In "dry" tunnels, dusts killed many subterranean termites in California tests, but moisture caked the dust and limited its usefulness.

In spite of the unfavorable evidence, it is possible that the use of dusts as a palliative measure has been neglected, particularly in cases in which more effective treatment cannot be made. This does **not** mean that a pest control operator can squirt a pound of Paris Green into the timbers of an infested building and call it a termite control treatment.

Fumigation of buildings to kill termites has not been successful. Hydrocyanic acid used commercially in California killed many termites but reinfestation occurred quickly. Chloropicrin was used in France with some success, but reinfestation occurred often enough to be disturbing. Chloropicrin is less toxic to termites than HCN, but penetrates wood better and therefore gives better final results.

Soil fumigation is an interesting method which may some day be used much more widely than at present. Chloropicrin is at present the best soil fumigant available. It has not been used much for fumigating soil for termites because it is very injurious to vegetation.

Orthodichlorobenzene, suggested frequently as a soil poison, probably acts as a fumigant. It persists longer than the more volatile fumigants and is therefore somewhat more desirable. Because it is a fumigant its effects cannot be permanent. Fumigants have serious disadvantages in heavy wet soils, where they fail to penetrate very far.

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Soil poisons have been used in an attempt to poison the soil moisture and kill the termites. This is a sound principle, but only a small portion of the soil moisture available to a colony can be poisoned. Unfortunately, the more effective materials poison plants as well as termites and cannot be used where vegetation must grow.

Sanitation, in the form of destruction of sources of food can be a real factor in controlling termites. This is true especially if it is done before a building is constructed. It is common practice to bury stumps and waste wood on the building site. This encourages termites. Large colonies can be reduced in size by removing such sources of food as stumps. Of course, if an infested building is present, removing such wood may result in a heavier infestation of the building unless protective measures are taken. Sanitation is usually the least expensive part of a termite job, and yet many operators ignore it.

Protection of Buildings

Infested Buildings. There is one basic principle of protection of an infested building, and that is to break all contacts, either direct or indirect, between wooden parts of the structure and the ground. This is not controversial—everyone agrees. Such a procedure prevents further termite entry, if the contact is broken completely, and natural forces usually take care of the termites left in the building. As these termites run out of water they die, and even though death may not eliminate the pests for months, no special measures are necessary. Naturally, if the infested wood is kept wet by leaks, etc., the termites will continue to live. In such cases, repairing of leaks will take care of the problem, and heat and fans can be used to speed up the drying process.

The method which can be used to break all contacts between wood and the ground require some discussion. The termite control committee of the National Pest Control Association issued a report (March 1940 PESTS) in which the fundamental operations for breaking these contacts were outlined. The steps were numbered for convenience (1) structural modifications, (2) soil poisons, (3) drilling and (3½) flooding.

The structural modifications stressed breaking of contacts by use of concrete, or by providing ample clearance between wood and the ground. Ventilation was stressed mainly for preventing rot, although it has an important place in preventing damage by termites. This is true especially if the ventilation reduces the humidity and helps dry out the soil under a building. For frame buildings, metal termite shields were specified "where economically feasible."

It is impossible to place too much emphasis on the quality and thoroughness of carrying out structural modifications. In most cases termites will be established firmly at the points of contact. Unless the reconstruction is done properly and actually breaks contacts, the termites will re-establish their channels of entry and continue their work.

One of the structural modifications used frequently is the termite shield. U.S.D.A. Farmers' Bulletin 1911: "Metal termite shields should be considered only as a supplement to good construction and not as a substitute for it." This is most certainly true in new buildings that are designed to be termite resistant. In actual practice in existing infested buildings, shields have been used successfully in Connecticut as a substitute for good construction.

There is enough new information on termite shields to justify a review of the entire subject. A metal termite shield is a barrier constructed of sheet metal and extending completely through or over the foundations of a building above the grade level, without cracks or holes, and with suitable extensions on either side. Such shields serve two purposes: (1) they protect woodwork above from termite entry through a foundation and (2) they were supposed to prevent entry by means of shelter tubes constructed up over foundations. "Strip shields" inserted in concrete walls had only the latter function.

Now we must consider the new evidence on effectiveness of shields. As far as their function in preventing entry through cracks, voids, etc. is concerned, there is no question. They are apparently highly satisfactory for this purpose. Recently Johnston published a paper entitled "Laboratory tests of termite shields" (Jour. Econ. Ent. 36: 386-392 June, 1943), which reports experiments demonstrating that termites can and do construct shelter tubes up over termite shields. A careful analysis of Johnston's report shows that the tests which seemed most reliable were conducted by congregating a large number of termites in soil in a gallon pail, furnishing wet paper as food, and making a lip in the edge of the pail to encourage tube construction out to the edge of the shield. The tests were made in a fairly high temperature and at high humidity. Regardless of amount of projection and whether or not the edges were turned down, termites crossed the shields. Furthermore, crossings were made in numbers and not in isolated cases. Johnston stated: "Results of these laboratory tests indicate that in high percentage of cases properly made and installed metal shields will prevent the upward progress of termite tubes through or over foundations to the woodwork of buildings, but shields should be used only as a supplement to good construction. The use of shields, therefore, should be accepted only as an additional precaution where it is desired to use every possible means to avoid an infestation.

"The use of shields does not guarantee complete control of termites even in cases where they are used in connection with good construction, for, as demonstrated by these laboratory tests, termites are capable of building their shelter tubes over any type of shield included in this test. Therefore periodic inspections for the presence of such tubes are necessary . . . "

It must be stated that this evidence is contrary to observations made on shields actually installed in infested buildings in Connecticut as well as in areas where termites are more active. The tests were conducted under conditions highly favorable to tube construction. However, if termites can construct shelter tubes up over properly installed metal termite shields under ideal conditions, these shields cannot be said to provide perfect protection from termite attacks.

The effect of this new information on effectiveness of shields cannot be assessed very well at present. Shield installation in this area has been stopped by shortage of non-corrosive sheet metal. However, it is to be expected that few home owners will install shields just for the extra protection, especially if periodic inspections are still required for complete protection against termite entry.

Chemical barriers. The use of chemical treating materials is an effort to establish a chemical barrier impenetrable to termites. These materials are toxic to termites and serve to reduce the number in the soil around a building. Chemical barriers are not always equivalent to physical barriers in effectiveness or permanence. And the most successful usage of chemicals has been in combination with termite resistant construction.

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There are three general types of soil treating chemicals: (1) internal poisons, such as the arsenical compounds; (2) fumigants, such as orthodichlorobenzene; and (3) repellents, such as coal-tar creosote and related compounds. In the Northeast the fumigant and repellent types have been less effective than the arsenicals. The heavy nature of much of the soil in this region as well as the high moisture content prevents penetration of the soil.

G. L. Hockenyos (PESTS, March and April 1940) has provided a very interesting and informative series of observations on the behavior of chemicals in soils. The more important of these may be summarized as follows:

(1) Soils vary in their capacity to hold liquids, sand holding the smallest and muck the largest amount.

(2) Volatile materials evaporate at characteristic depths, shallow for clay and deeper for sand. Sand held volatile liquids longer than heavier soils in one test; in another the loss of orthodichlorobenzene was greater from sand than from loams.

(3) Water will displace most treating materials commonly used.

(4) To saturate a cubic foot of soil with treating fluid, an average of forty pounds, or between four and five gallons is required.

(5) Soaps and wetting agents do not increase the rate of percolation of water through soil.

(6) Lateral diffusion of soil poisons is probably very small.

(7) A clay subsoil adsorbed about two-thirds of the soluble arsenate added, and each subsequent leaching removed a smaller amount than the preceding one.

(8) Drying treated soil concentrated the arsenate at the surface of the soil.

(9) Soluble arsenates were more effective than insoluble arsenates.

(10) The minimum effective concentration of sodium arsenate in a silt loam surface soil was about one pound in two hundred to four hundred pounds of soil (two to four cubic feet).

In the July, 1940, issue of PESTS, Hockenyos discussed the difficulty of obtaining a thorough mixture of soil and treating fluids and of keeping the toxicants well mixed. Strangely enough he comments that the only way to be sure of a thorough job is to excavate and poison, a process which **few operators do or can afford to do** unless other work is done to the foundation at the same time.

As far as methods of application are concerned, it is impossible to be too thorough in applying soil treatments.

Steps 3 and 3½ in the scheme are drilling and flooding, features designed for use in treating foundations and other masonry structures. The implication is that these steps are an additional chemical barrier called for in cases where the masonry is so "open" that termites can enter freely.

The N. P. C. A. steps are very logical and should be followed closely. There is no doubt whatever that first emphasis belongs on structural modifications to prevent termite entry. Chemical treatment done thoroughly and intelligently is a most valuable adjunct to these structural changes. So is ventilation and destruction of unnecessary sources of food (sanitation). As to the exact chemicals, dilutions, rate of use and methods of application, little can be said in addition to the information given above. The climate, type of soil, type of construction and degree of infestation should determine these factors. Certainly no chemical producing a fire hazard should be used in a wooden building. Further, care must be taken not to poison or pollute wells used as a domestic water supply. The protection of shrubbery is another serious problem in many cases. No method seems to be entirely adequate, and in many cases the best solution appears to be moving the shrubbery further away from the building plus the use of a barrier in the soil.

Shortages. Shortages of materials and labor should be mentioned. Structural changes are very difficult at present because of lack of labor. Some chemicals are short and others off the market. Furthermore, those of you engaged in a general pest control business have noticed a great increase in the demand for your services. It would seem logical to take care of the general business at the expense of termite control. In other words, termite cases could be accepted but not sought.

Shielding is certainly out until suitable durable metal is available. Emergency cases might be handled using sheet iron, but other means than shielding should be sought if possible.

The labor situation is probably the worst phase. Since everything depends on the quality of the workmanship, untrained, inexperienced or careless labor cannot be tolerated. This is likely to be a factor limiting the volume of work done.

New construction. You are all familiar with specifications for termite resistant construction of new buildings. Farmers' Bulletin 1911 places the proper emphasis on good construction. Following of the details carefully makes the use of a shield absolutely unnecessary. Apparently there is little or no interest in termite-resistant construction on the part of building officials, architects, builders or the general public. Unfortunately for the purchasers of new homes, this means more work for you in the future.

New York State Sanitary Code Amended

Amendment to the N. Y. State Sanitary Code, recently approved by the N. Y. State Public Health Council, follows:

CHAPTER IX
Certain Health Hazards.

REGULATION 9. **Poisonous insecticides and exterminators.** The term insecticide or exterminator as used herein shall mean and include any substances containing a poison used for the destruction or control of insects, fungi, vermin, rodents, or other pests, provided that the term shall not include fumigants nor products sold for manufacturing or non-insecticidal purposes. The term poison shall mean any drug, chemical or preparation which is liable to be destructive to adult human life in quantities of sixty grains or less. The sale, distribution, possession, or use of an insecticide or exterminator is prohibited unless the container bears a label legibly and conspicuously printed with the word "POISON" and the symbol of the skull and cross-bones in red, together with the antidote therefor and the name and address of the manufacturer, packer, or distributor. Bags, packages, barrels, and drums used as such containers shall have the word "POISON" and the skull and cross-bones indelibly printed, painted or stenciled thereon. The word "POISON" shall be in bold-face type of a larger size than the other wording except the name of the product and of the manufacturer, packer, or distributor.

Insecticides or exterminators in the form of a white powder consisting wholly of or containing arsenic in its elemental form or in any of its combinations or fluorine in any of its combinations if sold, offered for sale, or otherwise possessed or used shall be colored blue, red, or green to an intensity not less than value 8 chroma 4 in accordance with the Munsell System of Color Notation or to a neutral shade corresponding to a value of 7.0 according to said system. Such insecticides or exterminators when intended or used for agricultural purposes need not be colored unless kept, stored, or used in a room in which food is manufactured or prepared or in which powdered food is stored for purposes other than commercial storage or storage in transit.

This amendment shall take effect January 1, 1945.

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How Stored Product Insects Damage Food, Fur, Fabric and Wood *

By **H. E. GRAY**, *In Charge, Stored Product Insect Investigations, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Ontario.*

Editor's Note: Mr. Gray read the following paper at the Canadian Pest Control Operators' Conference, University of Montreal, Montreal, Canada.

THE INSECT DAMAGE in Canada to many of the products so essential to man represents an enormous sum annually. Cotton estimates that in the United States, insects which infest stored grain and cereal products alone exceed a total of at least 300 million dollars which is slightly in excess of two dollars for every citizen of the country. While the climate in Canada is distinctly less favourable than that of the United States for the development of many insect pests, our losses from this group are large and a considerable proportion of them might be avoided by carrying out suitable control measures at the right time.

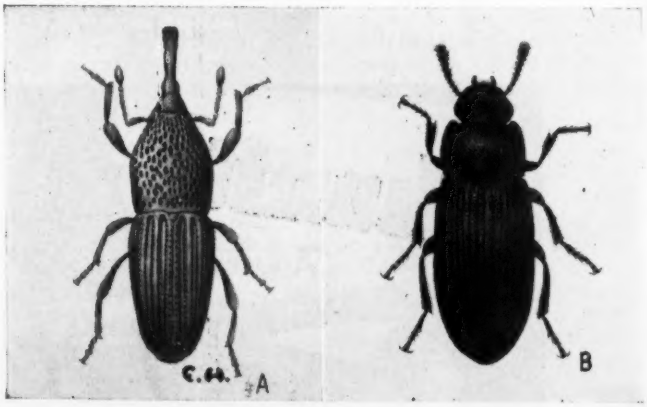
The losses suffered by stored product insects fall into a number of categories:

(1) Actual feeding by the insects.
(2) Contamination of the product by the presence of:
  (a) insect stages,
  (b) excrement,
  (c) webbing.
(3) Changes in the appearance of the product.
(4) Damage to containers.
(5) Damage to buildings.
(6) Increased cost of the product because of the necessity for trimming, reprocessing, etc.
(7) Incidental damage.
(8) Aesthetic damage, loss of custom, etc.

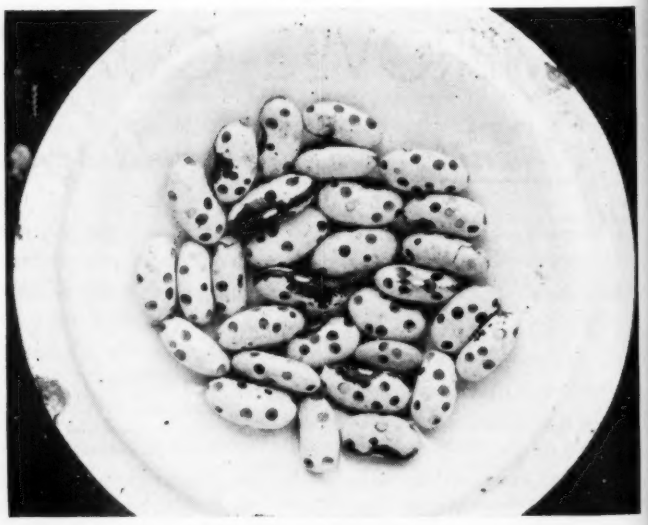
With the exception of the Cheese Skipper, **Piophila casei** Linne., practically all of the common stored product insect pests belong to the two orders Coleoptera and Lepidoptera with a few forms which belong to the class Arachnida. In all cases the active feeding stages have biting mouth parts. This is more or less to be expected as most stored products are reasonably dry and often quite hard.

Food Products: Relatively few insects can attack sound grain such as wheat, rice, barley, etc. In Canada the Granary Weevil, **Sitophilus granarius** L. and the Rice Weevil, **Sitophilus oryzae** L., and a few others such as the Spider Beetles are adapted to feeding on the sound grain. In this case the damage is quite evident by the holes in the kernels and the loss in weight of the product. The weevils are able to burrow into the wheat and lay their eggs within the wheat berry. The larvae which hatch are legless and simply eat about themselves until the entire inner portion of the kernel has been consumed, when they pupate in the shell which is composed largely of the bran. In case one of these larvae is accidentally displaced it dies because it has no method of locomotion outside of its natural environment. Sound wheat, therefore, is essential to these weevils. The adults may feed in wheat from which the larvae have emerged or even in flour but they can only reproduce in wheat, macaroni or hard masses of flour similar in consistency to the wheat itself.

In Canada we have no 'weevily' grades for grain and grain which is materially damaged must be diverted to feed. Beans are also attacked in a similar way by the Bean Weevil which can reduce the stock of beans to dust during a winter's storage in a warm location.



A—Granary weevils annually infest large amounts of stored grain.
B—Tribolium destructor, an European cereal pest recently found in North America.



Beans damaged by the bean weevil, a common pest of stored beans.

There is an intermediate group which includes the Indian Meal Moth, **Plodia interpunctella** Hbn., the Rust-Red Grain Beetle, **Laemophloeus ferrugineus** Steph., the Saw-toothed Grain Beetle, **Oryzaephilus surinamensis** L., and related forms—the Cadelle, **Tenebroides mauritanicus** L., and certain of the grain mites, which attack and damage the germ end of the kernel. When this has been destroyed the insects move on to other kernels. Grain mites, because of their small size, can enter the germ end of the kernel and frequently feed within this cavity and completely destroy this portion of the kernel.

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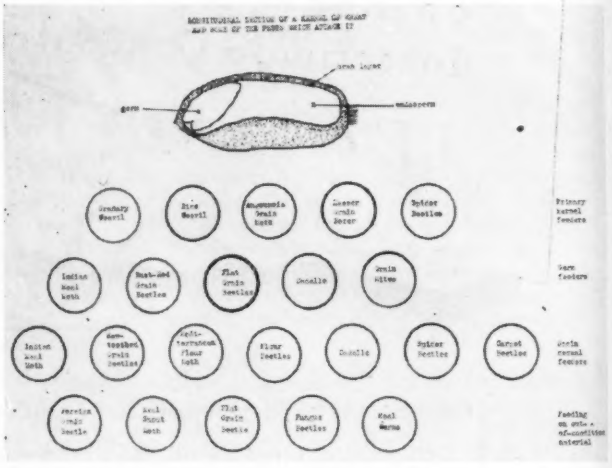
The Confused Flour Beetle, **Tribolium confusum** Duval, the Rust-Red Flour Beetle, **Tribolium castaneum** Hbst., the Mediterranean Flour Moth, **Ephestia kuehniella** Zell., the Black Carpet Beetle, **Attagenus piceus** Oliv., the Indian Meal Moth, **Plodia interpunctella** Hbn., Spider Beetles, and quite a number of other insects cannot live on the sound wheat for the reason that their mouth parts are not adapted to attacking large, hard, pieces of food. The flour beetles and flour moths scatter their eggs about and the larvae crawl about in search of food. These larvae are structurally quite different from those of the Weevils as they have legs and mouth parts which are adapted for eating small particles which may be taken between the mandibles. They feed readily upon the wheat from which Weevils have emerged or upon flour which has been ground from wheat. It is occasionally possible for these larvae to eat a portion of the germ end of the kernel from ground wheat but it is not a common procedure.

After the Granary Weevils and the Flour Beetles and other insects have fed on wheat for a time, because of their metabolic activities, changes occur in the wheat. These changes may be brought about by additions of moisture to the wheat which are also favourable for the growth of moulds and other organisms. In such grain, insects like the Meal Snout Moth, **Pyralis farinalis** L., and Fungus Beetles of the genus **Cryptophagus** are quite commonly encountered. Neither of these forms are of any importance in dry, sound grain but after the degenerative processes have started in the kernels, they are able to establish themselves and multiply.

Damage to Fabrics: The insects which cause the greatest damage to fabrics of animal origin are the Clothes Moths and the Carpet Beetles. In both cases the damage is caused by the larvae. Here the loss sustained is far out of proportion to the amount consumed. When a Clothes Moth larva or the larva of a Carpet Beetle cuts a neat little line about 3 inches long and ¼ of an inch wide in an imported rug, a ladies fur coat or even on a chesterfield, the amount consumed is only an infinitesimal part of the article but the loss in value is considerable.

The damage sustained to fabrics and related products is directly related to the topic of moth-proofing. Many materials have been used and of these the fluosilicates and fluorides are probably as good as any. The permanence of the moth-proofing treatment depends on what is done to the article after it is moth-proofed. There is no absolutely permanent moth-proofing material. If the moth-proofing agent is water soluble and a wool blanket is treated and subsequently laundered, part of the moth-proofing agent is removed. If the laundering is repeated, it is only a question of time until sufficient of the moth-proofing is removed that insects are able to feed upon and damage the article in question.

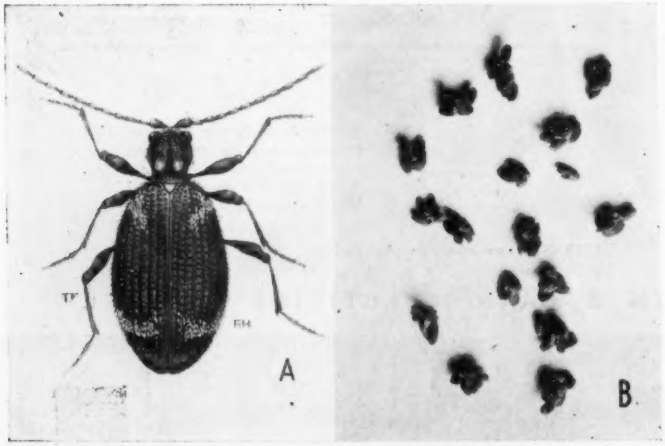
Furs: The same group of insects which damage fabrics also attack furs. Here too, the financial loss is large in proportion to the amount of material destroyed. Most furs are expensive and a few meals of sable, mink or chinchilla for the lowly clothes moth larva are just as expensive as a round of exclusive night clubs.



The summer storage of furs is also an interesting development in man's endeavour to combat these pests. There are two distinct schools of thought in regard to summer storage. The older one believes that furs should be stored at reasonably low temperatures because it has been thought to be better for the furs. The temperature, however, ordinarily used for fur storage will not kill either the eggs or the larvae of the Clothes Moths.

Careful experimental work carried out by Dr. Albert M. Read at the instance of Dr. L. O. Howard of the United States Dept. of Agriculture, demonstrated that a temperature of 40° F. rendered the larval and other stages of the insects which commonly attack furs, dormant. The larvae, however, were able to stand a steady temperature as low as 18° F. without any ill results. While a unifom temperature of 18° F. will not destroy the larvae of the Clothes Moth or that of the Black Carpet Beetle, an alternation of a low temperature with a comparatively high one invariably results in the death of the larvae of these two pests. For instance, if the larvae of either, which have been kept at a temperature of 18° F., are removed to a temperature of 40 to 50° F., they become slightly active, and if they are returned to the lower temperature and kept there for a while they are unable to survive a subsequent transfer to the warmer temperature. On the basis of this experimental work it has been recommended that storage companies should submit goods to two or three changes of temperature before placing them permanently in storage at a temperature of 40 to 42° F.

More recently there has been a movement toward fumigation and the use of higher temperatures for storage. The coats are fumigated when received from the owner and later transferred to a storage room and maintained at room temperature. The better storage firms fumigate the garments at regular intervals during the period of storage. The writer has examined samples of



A—Ptinus raptar Sturm., the most widely distributed spider hutte in Eastern Canada.
B—The larvae of the hairy spider huttes often feed in cemented clusters of wheat kernels.

fur which have been fumigated over a hundred times and they were indistinguishable from the untreated sample with respect to texture, appearance, lustre and "life".

Contamination by Insects: In the case of dried fruit, insect infestation is a very common occurrence. In addition to the presence of the larvae themselves, there is usually considerable webbing and excrement present in the product. A rather ingenious cleaning machinery has been devised. The material is put through a series of scouring brushes and liberally washed with water. Quite a good job is done on the fruit and incidentally a 40 lb. box may weigh 43 to 45 lbs. after the washing process is complete—temporarily at any rate. The webbing caused by insects, particularly in the case of the Mediterranean Flour Moth, is a serious operational matter from the miller's point of view. Where the insects are present in large numbers in a flour mill, the larvae frequently cause "chokes" by obstructing the passage of the material and causing it to pile up and overflow and the weight often damages the bolting silk screens. Furthermore, the stocks become mixed and there is a considerable amount of labour required to clean up the resulting piles of material. The actual cost of removing the webbing from spouts and machinery is high, particularly from a labour point of view, as in many cases the material is more or less inaccessible and it can only be removed slowly and with considerable difficulty. Thorough cleaning followed by fumigation is the method most frequently used in dealing with the problem.

Damage to Containers: Quite a variety of packages are damaged by insects. In the case of the cotton and jute bags, probably the spider beetles cause as much damage in Canada as any insect. Where serious infestations have occurred the fibres in the bags are frequently so badly cut that when an attempt is made to lift the sack, it falls apart. Paper is also badly riddled by these insects particularly when the larvae are mature as they frequently leave the containers to pupate in the wood of the building. The Cadelle is probably the most serious and the most difficult insect to control. It goes through most containers with ease and paper packages of all kinds are readily penetrated.

Cellophane while giving the product a very clean and appetizing appearance unfortunately is by no means insect-proof. Even insects like the larvae of the Indian Meal Moth readily penetrate all the grades of cellophane which can be used in commercial packaging.

Damage to Wood in Buildings: The outstanding example of damage to cut wood is of course the Powder Post Beetle, **Lyctus planicollis** Lec., which causes damage to timbers in storage as well as after they have been used for structural purposes.

In the stored product insect field there are several insects which at times cause damage to the buildings themselves. Probably the outstanding example are the larvae of Dermestids, particularly **Dermestes vulpinus** L., the Hide Beetle which serves a useful purpose in the bone room of an abbatoir by removing the remaining flesh from bones. In these rooms in certain packing plants these insects are frequently present in enormous numbers. When the insects are ready to pupate they often penetrate into the building supports which are reduced to mere shells. On one occasion an 8" x 8" section was so badly damaged that it was easily broken with the hands.

The larva of the Cadelle also drills holes into wood in search of a place to pupate and in certain old elevator structures, numerous examples of the damages to such timber have been noted. The larvae of the Yellow Meal Worm cause a somewhat similar damage although they

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are not as prone to drill into wood as the insects mentioned previously.

The larvae of the Spider Beetles frequently form pupal cells in the surface of the wood of a warehouse in which the infestation has occurred. Where serious infestations have been present, the whole surface may be scarred with a series of small holes about the size of B. B. shot. When a warehouse is being examined, this scarring affords a good indication of previous trouble with these pests.

Increased Cost of the Product Because of Necessity for Trimming, Reprocessing, etc.: One outstanding example of this type of damage is the infestation of cheese by mites. These small forms of life burrow beneath the waxed cheese-cloth and form holes and tunnels in the product. When the infestation is discovered, the usual procedure is to trim the cheese to remove these damaged spots and to rewax it. There is a considerable amount of loss in connection with these various operations as well as a labour cost.

Incidental Damage: Insect infestation sometimes occurs in connection with various products. The writer well recalls the concern and alarm expressed by a milling company which was loading a boatload of flour for shipment overseas. Previous examination revealed that both the boat and the flour mill itself were in excellent condition. Prior to completing the loading there was a holiday and the following morning the writer received a very urgent phone call to make a further examination of the boat because of an alarming number of insects. Both the captain of the boat and the manager of the milling company were greatly exercised over the matter. It was found upon examination that the hold of the boat contained a large number of specimens of the Clover Root Weevil and Clover Leaf Weevil. It just so happened that these insects were in flight at the time of loading and with the holds open, the insects dropped into the boat where they were discovered by the loading crew. The movement of a few layers of sacks and a thorough job of sweeping removed the offending insects and harmony was restored.

Another incident of this type was reported a few years ago by one of the fabric manufacturers. Certain new and rather expensive dress goods upon being opened in the retail store were found to have holes through them at regular intervals. An examination of the board on which the cloth had been wrapped disclosed that it had contained one of the round headed borers and as the wood was used without heating or fumigation, the borer drilled its way from the wood to the outside of the roll thereby ruining quite a quantity of dress goods. All these incidental occurrences, while laughable afterwards, are quite serious to the people concerned at the time of occurrence.

Aesthetic damage, Loss of Custom, etc.: The aesthetic damage while rather intangible is none the less real. The public has been educated to feel that insect stages in food products are distinctly distasteful. While we may like meat for breakfast we prefer bacon to even the most tempting dish of rolled oats garnished with Mediterranean Flour Moth larvae. We all prefer to bite into a candy bar without a worm and cheese without mites or skippers. In order to satisfy a discriminating public, the food manufacturer must take precautions to ensure that his product is insect-free. The cost of exchanging material or reconditioning it and the loss of custom because people buy other brands when they experience insect trouble in the one previously purchased, are all considerable items of expense to the food manufacturer. He receives a certain number of complaints but usually feels and rightly so, that there are many others which have occurred which are never brought to his attention. The only reaction of the customer is to buy another product and probably advertise the fact that such and such a product is lousy with bugs.

Food manufacturers and others can do a great deal to prevent damage to stored commodities. Frequent inspection will keep them advised as to the condition of stocks on hand and infestations can be stopped before they have really gotten well started.

To ensure that inspections are made regularly and carefully, someone must be made responsible for this phase of work. Either a qualified employee should be chosen or the services of a pest control operator should be secured on a contract basis to do this type of servicing. The latter is in a very good position to combine this type of work with his purely control efforts and to render valuable services to all warehouse owners. Prevention is just as valuable a service as cure and this is a field in which the pest control operator can very well spend some time and which will be profitable to both the operator and the customer.

*Contribution No. 2301, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

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SOME REMARKS ON THE BEDBUG: It's Life-history, Habits, and Control

By C. R. TWINN, *Ottawa, Ont.*

Editor's Note: Dr. Twinn, Associate Entomologist, Division of Entomology, Canadian Department of Agriculture, read the following paper at the Canadian PCO Conference held at the University of Montreal, Montreal, P. Q., Canada, February 21, 1944.

THERE ARE INDICATIONS that under war conditions the problem of the bedbug has become increasingly serious in many parts of Canada, especially in urban areas where war needs have brought about overcrowding and shifting of populations. This is a subject on which members of the Canadian Pest Control Operators' Association are doubtless well informed.

In control work against the bedbug a knowledge of its life-history and habits is of material value. An important contribution in this connection is a paper by Buxton and Johnson (2) summarizing new knowledge on the ecology of the bedbug, published in 1942 by the British Medical Research Council. Some of the statements in the present paper are based on information from that source and from other articles included in the list of references.

Hosts

While man is the preferred host of the bedbug, it is a non-specific parasite and will feed readily on a number of animals and birds including mice, rats, guinea pigs, rabbits, fowls, and canaries.

Activity and Feeding

Bedbugs are normally active at night and hide during the daytime in cracks and crevices and under or behind objects that afford concealment. Maximum activity occurs just before dawn and most of the bugs return to their hiding places after daybreak. When very hungry, the bugs will feed in subdued light in the daytime, especially in theatres and other public gathering places in which the furnishings have become infested. The adult bug engorges in 3-5 minutes according to Back (1) and 3-10 minutes according to Cummings (4): the latter states that the nymphs take a shorter time.

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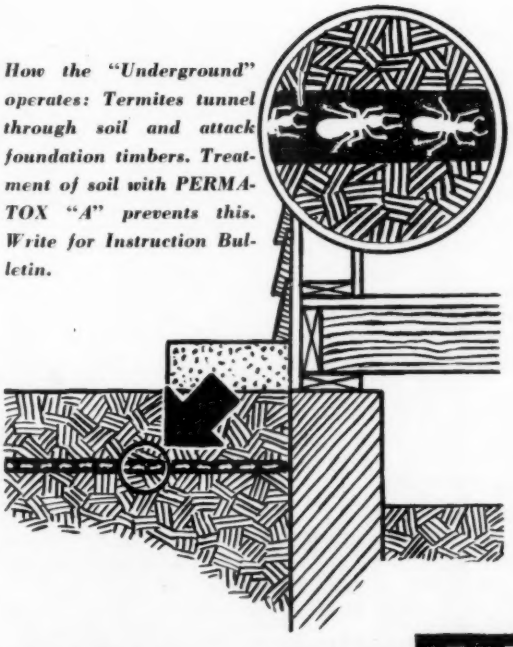

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Number and Hatching of Eggs

The number of eggs laid may exceed 500, but usually averages about 200, these being deposited under favourable conditions at the rate of 3-4 a day. Well-fed females deposit a maximum number of eggs at temperatures above 70° F.; very few are laid between 50° and 60° F., and none below 50° F., when the insects are inactive.

The eggs hatch in 6-17 days at temperatures over 70° F. (1). At slightly above 55° F. the eggs develop and hatch on the average in seven weeks (2).

Development

From the time the bedbug hatches until it reaches maturity it moults five times and has to feed between each moult. Various factors, of which the most important are temperature and the availability of hosts, affect the rate of development of the insect. Back states that under ideal temperature and food conditions development from egg to adult may be complete in 4-6 weeks, and there may be three or four generations a year in heated houses. A perusal of a graph published by Buxton and Johnson indicates that, provided a host is easily accessible, the period of development from egg laying of one generation to egg laying of the next may extend from about five weeks at 82° F., to about eight months at 59° F., a temperature only a few degrees above that at which moulting and egg laying cease.

Longevity

The length of a bedbug's life after it reaches maturity is a matter of practical interest. The female when normally fed and laying eggs may live from about two to eleven months, with an average of possibly 6-8 months. Temperature and food are important deciding factors in longevity and these and other variables render it difficult to make a definite statement on the subject.

Survival of Unfed Bedbugs

Another matter on which it is important to have knowledge is the length of time bedbugs can survive under starvation conditions, such as in temporarily unoccupied dwellings. More than 170 years ago DeGeer, in his "Memoirs on the History of Insects" (1773), mentioned keeping several bedbugs alive without food for many months (**vide** Cummings). Buxton and Johnson have thrown light on this question. They found that for long life without food the relative humidity must be high, to reduce loss of water by evaporation, and the most favourable temperature is about 55-57° F. At comparable humidities the life of the bedbug is shorter both above and below this temperature. Large nymphs and adults outlive the smaller nymphs, and virgin females outlive mated females. At a relative humidity of 90 per cent, mated females lived an average of 143 days (nearly 5 months) and a maximum of 225 days (7½ months) at 64.4° F., and an average of 286 days (9½ months) and a maximum of 465 days (15½ months) at 44.6° F. They concluded that the average period of survival of fasting adult bedbugs under optimum climatic conditions may equal one year, the maximum exceeding one year.

Regarding the survival without food of the immature stages, Back records that newly hatched nymphs have lived nearly three weeks at temperatures above 80° F., and five months at 60-65° F. With one blood meal they lived nine months.

Effect of Temperature on Bedbug Populations

Buxton and Johnson have recorded some significant data on the effect of temperature on the abundance of

* **Cimex lectularius** L.

** Contribution No. 2297, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

bedbugs. The bedbug population in an unheated bedroom (in England with temperatures possibly averaging between 40° and 50° F.) at the end of winter would consist mainly of adults (with a large proportion of the females unfertile), large nymphs, and a few small nymphs. It is improbable that any eggs would survive. Available data lead the authors to the supposition that the bugs surviving the winter might multiply twenty-fold during the summer and be reduced again to their former level by subsequent winter mortality. On the other hand, in heated rooms where the average temperature in the coldest month is not much below 56° F., the bugs would survive well, and increase perhaps seventy-fold during the following summer. As there would be little decrease the next winter, an enormous population would be built up.

In Canada it is customary to heat all dwellings during the winter months because of the severe climate, and to maintain higher temperatures in the home than would be generally tolerated in England. Because of this and the hot weather in the summer, bedbugs may quickly become an intolerable nuisance in habitations where they establish themselves, unless prompt and effective measures are taken against them.

CONTROL

Fumigants

Because of the habit of bedbugs of hiding and laying their eggs in cracks and other places where it is more or less difficult to reach them, best results in control work are obtained by using a fumigant or a liquid insecticide that penetrates readily. The excellence of hydrocyanic gas in killing the bugs and their eggs, its dangers and limitations, and the precautions necessary in employing it, are probably too well known among pest control operators to warrant repetition here. Sulphur dioxide is a safer gas to use but, in addition to tarnishing metals and bleaching wallpaper and fabrics, is not very effective, especially against the eggs and nymphs, and repeated fumigations are required.

Sprays

When it is not feasible or convenient to fumigate, sprays give good results when thoroughly applied, preferably with an electric or other form of power sprayer. In the past, sprays containing pyrethrum extract in a refined kerosene type oil base gave satisfaction. Pyrethrum is not now obtainable for this purpose owing to the urgent need of it for the protection of the armed forces overseas.

Fortunately, certain synthetic insecticides are available and have become widely used. Recently, Calloway and Musgrave (3) published results of experiments which indicated that, against bedbug eggs, 3 per cent n-butyl-carbitol-thiocyanate* is superior to 0.4% pyrethrins in refined kerosene, or a mixture of 1 per cent n-butyl-carbitol-thiocyanate and 0.1 per cent pyrethrins. In this connection it should be pointed out that an accepted minimum standard for fly sprays is 0.12 per cent pyrethrins. In another paper, Musgrave (6) reported that a 3 per cent solution of n-butyl-carbitol-thiocyanate in a carrier oil gave good results against bedbugs in houses when applied with an ordinary hand sprayer giving a continuous

* 6 per cent Lethane 384.

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spray. In one small house more than 2,000 dead bugs were collected after treatment. He also got promising results with a spray consisting of 0.13 per cent pyrethrins in a heavy oil. A mixture of 0.065 per cent pyrethrins and 1 per cent n-butyl-carbitol-thiocyanate was effective.

It is of interest to note here that the Bedbug Infestation Committee of the British Medical Research Council recommend for use against bedbugs in air raid shelters kerosene sprays containing 0.6 to 0.8 per cent pyrethrins, or 6 per cent Lethane 384, or 3 per cent lauryl thiocyanate.

Lethal Temperatures

In addition to fumigants and sprays, temperatures lethal to the bugs may be employed. In the practice known as superheating the temperature of infested articles or premises is raised to 120° F., or higher, and maintained there for several hours. This practice has limitations as it is usually only practicable in hot summer weather, and commonly requires the employment of auxiliary heating equipment. Moreover, it is inconvenient and uncomfortable and may be accompanied by some fire hazard, and is only fully effective when the required temperature has penetrated to all places where the bugs have taken refuge. According to Buxton and Johnston, bedbug nymphs are killed by a temperature of 111.5° F. in 1½ hours; adults succumb in 1 hours at 111.2° F., and eggs at 113° F.

Another finding of these authors is that bedbug nymphs and adults are killed in one hour by exposure to a temperature of 0.4° below zero Fahrenheit, and in two hours at 1.4° above zero. No similar data on eggs was available. These data seem to indicate a useful, simple and inexpensive method of ridding furniture and other goods of bedbugs during the coldest winter months by exposing the infested articles outdoors overnight in sub-zero weather.

Cleanliness

The value of cleanliness and good housekeeping practices by the general public in preventing, reducing or getting rid of bedbug infestations should not be overlooked. Gunn (5) in England goes so far as to state that "There can be little doubt that lack of domestic cleanliness is the principal factor in bedbug infestation". The public spirited pest control operator might do some useful educational work along these lines.

Improved Building Design

Improved building design and construction to reduce harbourages for bedbugs and other insect pests and to facilitate disinfestation when necessary has an important bearing on the problem of bedbug control. Some useful suggestions in this connection are included in section VI of the Report of the Committee on Bedbug Infestation 1935-40 published by the British Medical Research Council (see item 2 in the following list of references).

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The Biology and Control of Eastern Moles

By **GEORGE B. LAY**, *District Agent, Fish and Wildlife Service, United States Department of the Interior, Boston, Mass.*

ALTHOUGH there are five groups of true moles in the United States, this article is confined to a discussion of the biology and means of control of only the three eastern species. Generally speaking, the western forms may be controlled in the same manner as the eastern ones.

The Common Eastern Mole (Scalopus aquaticus) is found in the eastern half of the United States, south of southern New England, southeastern New York, Michigan and central Minnesota, but further north in the higher elevations. The Star-Nosed Mole (Condylura cristata) and Brewer's Mole (Parascalops breweri) are found in general in the areas and states to the north and in the mountainous regions to the south of the range of the Common Eastern Mole.

Habits and Description

Moles may be very plentiful in one area and almost nonexistent in another, depending on humidity, precipitation and soils. These animals are most abundant in moist, somewhat shaded areas. They are not rodents but belong to the Insectivora, a group of mammals that feeds largely on small whole organisms, such as adult and larval insects, earthworms, white grubs and other animal tissues. Moles live almost entirely beneath the surface of the ground. The mole can be distinguished from the rodents and from the shrews by its short, stout, front limbs, ending in broad, rounded hands with strong claws and with palms turned outward. The mole has a rather elongated body with close and plushlike fur, a pointed snout, a short tail and neither external eyes nor ears. An exception is the Star-Nosed Mole, which has eyes that are easily discernible. The Common Eastern Mole is nearly blind but can distinguish between light and darkness by means of the remains of its sight organs which are completely beneath the skin. The sense of smell of this animal is highly developed and its nose or snout aids it in finding its food through both smell and contact.

Moles usually have their nests along fences, hedges and under tree roots. Their runways often make up a labyrinth of what appears to be an unplanned pattern of tunnels. Some of these runways are used continuously and others are made for the purpose of hunting food and then followed no more. The animals are active throughout the day. Following rains, except during fall and winter, they extend their surface runways, and, at such times, their runways are nearest the surface and the animals appear to be most active. During winter they use old runways or work at depths below the frost line. Moles are slower breeders than rodents, for instance. The Common Eastern Mole usually has four young, born early in the spring. At the age of one month, the young are almost full grown, and are able to fend for themselves. Moles have insatiable appetites and captive animals have been found to eat more than their own weights in a 24-hour period. For their size they are very strong animals and do a tremendous amount of work in a day.

Damage

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of tulips and iris with their strong front feet and some of these shreds may be eaten. Smaller roots are readily chewed up. Damaged roots are mangled but not cut clean, as the animals' teeth are short and unsuited to gnawing. The animals also eat sprouting corn, other seeds, root crowns of rhubarb and asparagus.

The mole does damage through disfigurement of lawns and golf courses and it may ruin seed beds in gardens and nurseries. Frequently these animals will injure commercial crops and flower beds by eating the planted seed and also the roots of growing plants. More often, however, its damage to plant life is due to the heaving upward of the plants when it makes its runway, thus cutting off the moisture supply and injuring the roots.

As other small mammals often use the mole runways, damage done by these trespassers results in a loss of good reputation by the moles. Meadow mice, shrews, and sometimes house mice, rats and pocket gophers, use mole runways and cause injury to seeds, grains, tubers and roots of cultivated plants. The tooth marks left on damaged materials and trapping have proved this to be the case and in some places in the East these trespassers have been found more numerous than the moles.

Although the mole is controlled to some extent by natural enemies, this animal has an odor which is repellent and distasteful to some of the predators, such as domestic cats and dogs. Some moles are eaten, however, by the mammalian predators, hawks, owls and snakes. Floods very often destroy these animals over large areas.

Trapping

The only certain method of controlling moles, which is recommended by the Fish and Wildlife Service, is by the use of special mole traps, of which there are several types. The "prong" type (harpoon) trap is the style recommended for the northeastern part of the United States, and this type is the one most commonly stocked by hardware stores and other dealers. Other types of mole traps are most successful against the larger moles of Western United States. Trapping the Star-Nosed Mole is difficult regardless of the trap used; but, fortunately, the Star-Nosed Mole is less generally distributed and does not occur except in spots of small acreage and usually on non-crop land. This animal seems to be less detrimental to crops.

The selection of a frequently used runway for a trap set is of prime importance. Surface runways are indicated by conspicuous ridges. Many of these runs are used only once, primarily for feeding purposes, while others are used regularly. Thus, one should try to locate the "main" runways. The trapper can identify used tunnels by stamping down the conspicuous ridges in several places. These places should be inspected daily and restamped for two or three days, if necessary. If the stamped places are raised each day, it is a very good indication that active runways have been found. These stamped places can be marked with hydrated (slacked) lime or sticks, to facilitate locating them. It is not necessary to place a trap at each such raised (repaired) place, as one trap, carefully tended, will catch, over a few days, all the moles on a small area.

As the home of the mole is usually located under hedgerows, stone walls, paths, rubbish mounds or such permanent sites, moles must enter the lawn, garden or other area from these border points. Thus, it is possible quite often to set the traps at the border rather than in the middle of a lawn or garden. If such border runways are seen, when attempting to locate suitable trap spots,

these should be checked as to activity by stamping them down as described above.

If moles are found in corn, grain or other fields, it is suggested that a four-inch furrow be made about such fields to locate runways and likely spots to put traps. If such a furrow is made, active runways will show up in it quickly, as they will be raised within a day or so. Begin trapping at once and move traps to new sites every 24 hours. All traps can be set at these border spots rather than inside the field, except in the few cases where moles may have established somewhat permanent homes within the field.

Instructions for setting traps are furnished generally by the manufacturer so that his instructions should be followed carefully. Failure to get results with traps is usually due to poor setting of the traps.

Gassing

Experiments so far have indicated that gassing is not a dependable or practical method of control, except in unusual cases, as moles will avoid gas if possible. It is also possible that these poison gases may injure grass and other vegetation. Under certain limited conditions,. when the soil is compact, gassing with calcium cyanide dust or carbon disulphide at frequent intervals along the runways, so as to completely fill the burrow, may prove successful. Such gases often act as very temporary repellents.

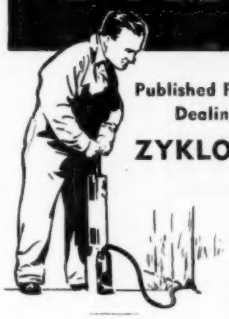
Repellents

Substances such as lye, paradichlorobenzene and naphthalene flakes seldom give satisfactory control; but in some cases, repellents do drive the moles from small areas where protection is needed. Experience seems to indicate that moles often will merely block off repellents and dig parallel runway detours, unless a complete soil fumigant is used. The castor bean is valueless, despite contrary opinion. The use of repellents to set up barriers around large areas is not practical; but repellents may prove to be of some value to protect seed beds, small nurseries and special rows of valuable bulbs and other plants.

Poison Baits

The Fish and Wildlife Service does not recommend the use of poison baits for controlling this animal, as such methods have not proved successful, economical or practical, since many different kinds of poison baits have been tested on the Common Eastern Mole with unsatisfactory results.

FUMIGATION NEWS



Published For The Information Of The Pest Control Industry Dealing With Fumigation Involving The Use Of

ZYKLON DISCOIDS AND CYANOGAS

AMERICAN CYANAMID & CHEMICAL CORPORATION
Insecticide Department
30 Rockefeller Plaza, New York 20, N. Y.
Branch Offices—625 Dwight Bldg., Kansas City 6, Mo.
2203 Ferry St. South, Seattle 4, Wash.—Azusa, Cal.

CLOTHES MOTHS DESTROYED WITH ZYKLON DISCOIDS

With the season now approaching when clothes moths are most active, the Pest Control Operator need hardly be reminded of the satisfactory results to be obtained by fumigation with ZYKLON DISCOIDS. A dosage of 8 ounces per 1,000 cubic feet of space and exposure for 12 hours at a temperature of at least 65° F. does a real moth-killing job.

In the control of insects, it is frequently helpful to be familiar with the life history and habits of the species involved. The following description of the clothes moth is from the ZYKLON DISCOIDS FUMIGATION MANUAL, which is obtainable on request.

The clothes moth passes through four stages, namely, egg, worm or larva, pupa and adult. It is in the worm stage only that the insect feeds on the wool, fur or other animal matter which it infests and damages. In houses which are heated, these pests may breed throughout the year.

The egg hatches out in about six days. The larva stage consumes anywhere from thirty-five days to three years, depending on conditions of temperature and humidity. The time spent in the pupal stage is usually ten days, while the length of the adult period varies from seven to thirty days.

For successful moth fumigation, no other known fumigating material can equal in effectiveness hydrocyanic acid, the active ingredient in ZYKLON DISCOIDS. Its toxicity is the measure of its efficiency as a fumigant. ZYKLON DISCOIDS, in convenient small containers, are ready for immediate use.

ADVANTAGES OF FUMIGATING WITH HCN

(ZYKLON DISCOIDS are the most concentrated form of HCN—96-98%)

1. It is the only fumigant that is a lighter-than-air gas.
2. Being lighter than air, HCN clears out of the fumigated spaces quicker upon ventilation.
3. HCN does not settle to form dangerous concentrations outdoors, being lighter than air. As it issues from the ventilated building, it rises and readily dissipates in the open air.
4. HCN is not flammable or explosive at concentrations used for fumigation.

TYPHUS FEVER EPIDEMIC CURBED BY RAT CONTROL

When a severe outbreak of typhus fever occurred in a large Tennessee town, the Health Department undertook the work of cleaning out the city and reducing its rat population to a minimum. Their efforts were concentrated on three principal and previously determined foci of infection.

The application of CYANOGAS* A-Dust to rat burrows was carried on during the course of the campaign accounting for many thousands of dead rodents. CYANOGAS* G-Fumigant was used in general building fumigation in a number of large food manufacturing plants and warehouses where large quantities of foodstuffs were stored. In one of these buildings alone a total of 360 dead rats were recovered after fumigation.

It was only through these rat eradicative measures that the city's typhus fever epidemic was brought under control.

Cyanogas Foot Pump with 5-pound reservoir which makes frequent interruptions for reloading unnecessary.

*Reg. U. S. Pat. Of.

HELPING to WIN the WAR on PESTS with ACME Gas Masks

Wartime restrictions, man-power shortage, and other factors have greatly increased exterminators' activities. Now, more than ever before, they require the best equipment available to maintain today's busy schedule.

Acme No. 4 FULL VISION Gas Masks are being used by Pest Control Operators with highly efficient results. These masks provide FULL VISION that is NOT distorted, thereby increasing the efficiency of the operators, and enabling them to do their work more speedily. Acme Masks fit the face snugly without undue pressure, eliminating the possibility of headache discomforts. Protection is provided against all fumigating gases, or combinations of gases.

Write for Prices and Literature - Today

BUY MORE WAR BONDS

ACME PROTECTION EQUIPMENT CO., INC.

Manufacturers of Respiratory Protective Devices

3616 LIBERTY AVENUE PITTSBURGH, PA.

"TOX-EOL" 12½ TO 1 SUPER CONCENTRATE

NOW AVAILABLE WITHOUT PRIORITIES

FOR TERMITE CONTROL

Chlorinated Phenol Toxic Base, which has been effectively used for many years by the larger Termite Control Operators from Coast to Coast in the "TOX-EOL SYSTEM" of Termite Control.

This new super strong CONCENTRATE may be diluted with 12½ parts Fuel Oil, Kerosene, or even Crank Case drainings to make the proper strength (over 5%) treating solution.

"TOX-EOL" 12½ CONCENTRATE means lower transportation charges, fewer containers—lower chemical cost. Now costs less than creosote.

FOR WOOD OR SOIL TREATMENT

Write for our plan of dealer co-operation and 5 year Warranty.

CRE-O-TOX CHEMICAL PRODUCTS COMPANY

Pioneers in the use of Chlorinated Phenols for termite control.

MADISON AT WILLETT MEMPHIS 4, TENNESSEE

Other Methods of Control

Moles may be killed by watching them when they are extending their surface runways and then throwing them out of the ground with a shovel or hoe, after which they may be crushed. The animals sometimes may be drowned by flooding runways, especially in early spring when the young are most likely to be in the nest and are unable to escape the water. The success of this method depends upon the topography of the land. Small areas, where valuable plants require special protection, may be enclosed with woven wire fence or with concrete walls. Galvanized hardware cloth, with 3 meshes to the inch, will last several years. A concrete wall an inch or more thick will prove cheaper in the long run. Where wire fencing is used, it should extend below the ground surface at least a foot and then at 45 degrees from perpendicular outward and downward at least 6 inches.

Frequent cultivation naturally discourages a burrowing animal. Continuous working of strips in large areas, although often not practical, will act as partial barriers and slow up the movements of these animals into cropped sections. However, as the animals are of definite economic value to the farmer, it probably is not wise to keep them out of crop land when there are no growing crops thereon. During such periods the moles can do little damage and will eliminate many insect pests.

Rat Eradication Program Advocated By Dr. T. E. Snyder at New Orleans Academy of Sciences Meeting

Dr. T. E. Snyder, in his farewell remarks as president of the New Orleans Academy of Sciences, at its Ninety-First Annual Meeting, urged that the "Academy should go on record in the advocating of a rat eradication program, including the more effective collection of garbage by the City." He added that "this would prevent the further spread of murine typhus fever" control of which is "far more important at the present time with the increased number of military personnel in the City."

Held April 28-29 at Tulane University, New Orleans, La., the meeting comprised sections on the physical, biological, medical and social sciences, including chemistry, with Dr. Snyder presiding. There was also a program devoted to the Junior Academy of Sciences. Addressing the Annual Dinner on April 28, at Arnaud's Restaurant, was Mr. Robert J. Usher, vice-president of the Academy, who spoke on "History of the New Orleans Academy of Sciences."

Of note is the fact that between June 1943 and April 1944 the Academy has had a total of eight lectures.

England's Cat Army

England recently started calling cats into service when the Ministry of Supply was faced with the fact that rats and mice were infesting Britain's secret food camps and destroying thousands of pounds' worth of foodstuffs. Also, with the Nazi bombings of England making labyrinthine openings for the rodents to navigate in undisturbed comfort, bubonic plague, which they transmit, was beginning to spread in some locations.

Now each member of the cat army is ceremoniously inducted, given a number, placed on the government pay roll and stationed on the home front in factories, stores, warehouses, food stations and markets. A government cat's wages are from 2d. to 3d.—tuppence to thruppence to an English tabby—a day.

So valued have cats become that it is getting to be unpatriotic to throw things when they start their nocturnal caterwauling. Furthermore, since cats cannot live on rats and mice alone, the Ministry of Food has co-operated with the Ministry of Supply and made arrangements to supplement their diet with D rations—that is, milk. Fresh milk being unavailable, they are given the dehydrated or tinned variety. They are not fed solid foods, though. This would tend to dull their appetites and take the fine edge off their rat-catching instincts.

—*Eugene Felderman.*

Ultra-Violet Light:

an Aid to the Pest Control Operator

By ERNEST M. MILLS, *U. S. Fish and Wildlife Service, New Brunswick, N. J.*

THE USE OF the ultra-violet light to determine the presence of rats and mice and the contamination of food and other products by rodent urine is a new technique. It is helpful to know definitely the extent of a rat and mouse infestation on a given premises and the exact locations where rats and mice have been before using rodent control measures. Of course, the observation of feces, tracks, gnawings, etc. will usually indicate an infestation. However, in some cases, these signs have been removed or are indistinct. In addition, it is often impossible to discern by ordinary methods the exact pathways of these rodents or where they have deposited urine. Ultra-violet light will energize the fluorescence of rodent urine so that the exact location where rats and mice have passed can be detected.

Ultra-violet rays are invisible to the human eye. For fluorescence purposes, the wave length range of the rays should be between 2,000 A. U. and 3,800 A. U. Until a few years ago, it was necessary to employ quite expensive and bulky apparatus including an auxiliary transformer to produce these rays. Since 1940, a lamp has been developed that can be used on any regular 105-120 volt light circuit and screwed into any regular light socket that is a part of a reflector as used in amateur photography; a deep conical reflector is necessary to cut off extraneous light and to confine and concentrate the ultra-violet light. This new lamp is known as "250 watt Purple X lamp." It has a life of about 50 hours but to lengthen the useful life period it must be used intermittently due to the intense heat generated. The lamp should be used in accordance with the instructions of the manufacturer. The combination is thus portable, restricted only by the length of an extension cord.

At the present time, these Purple X lamps are difficult to obtain, requiring a AA-2 rating if the dealer wishes to replace his stock. These lamps have been manufactured by General Electric Company and Westinghouse Electric and Manufacturing Co. There is also on the market less portable apparatus which operates continuously and is more adapted for laboratory use. One such manufacturer is the Rainbow Light Company, Philadelphia, Pennsylvania with the equipment trade name of "V-Ray Black Light."

There is a wide variety of general uses for ultra-violet light. It is employed to energize such fluorescent materials as oils, paints, laundry markings, minerals, and drugs. For example, there is a contrasting fluorescence in color betwen cottonseed, olive, and cocoanut oils.

In rodent control work, this light is chiefly used to detect the presence of urine on cloth and paper bags, in food, or about other objects. The apparatus is simple to use. Merely direct the light upon the object and, if urine is present, there will be fluorescence or contrast visible. The color will be of a somewhat greenish hue, similar to the color of radium-painted clock hands. This light gives best results at night or where all other light is absent but it may be used in buildings in subdued daylight if the reflector is tilted so as to reduce the visible light and is held within three or four inches of the surface being inspected. Of course, the urine of domestic animals will also fluoresce. If the characteristic fluores-

Lepidopterous Insect
belonging to the division Heterocera, as distinguished from the Rhopalocera
ENCYCLOPAEDIA BRITANNICA

MOTH to you . . . and shown enlarged about four times.

Tough to some, but all in the day's work for

Larvacide

. . . even in deep upholstery, thick blankets or 'way in the center of that tightly packed trunk.

LARVACIDE is a tear gas fumigant with unmistakable warning of its presence that cuts accident risk. It has no fire or explosion hazard. LARVACIDE literature contains information of value to every P.C.O. It's FREE. Write for it.

INNIS, SPEIDEN & CO., 117 Liberty St., New York 6
BOSTON, CHICAGO, CINCINNATI, CLEVELAND, OMAHA, PHILADELPHIA

LARVACIDE comes in liquid form, in cylinders, 25, 50, 100 & 180 lbs. and 1 lb. dispenser bottles, each in sealed can, 12 to case. Stocked in principal cities.

SOLVE FLASHLIGHT "Dry Cell Shortage"

with **IDEAL** *Rechargeable* **STORAGE BATTERIES for Flashlights**

Replace unavailable dry cells with IDEAL *Rechargeable* Flashlight Storage Batteries. Enjoy a bright, steady, dependable light—always. Conserve Critical Materials. Easily recharged with IDEAL Battery Charger which is available in single, 6 and 12 gang size. Guaranteed Service. Write for Bulletin BB444.

SOLD THROUGH JOBBERS

Sales Offices in all principal cities
In Canada: Irving Smith Ltd. Montreal, Quebec

IDEAL *Sycamore*
★ IDEAL COMMUTATOR DRESSER CO ★

5203 Park Avenue • Sycamore, Illinois

PENETRATE—

YOUR TERRITORY WITH THE

MOTHPROOF LIQUID THAT "PENETRATES"

Now that woolen conservation is so vital to "UNCLE SAM'S" war program, there is still greater need for Moth protection. You can help "America" protect its valuable woolen materials by selling "PER-MO" Mothproofing Service. Full particulars and prices first letter.

PER-MO MOTHPROOF CO.
3729 Virginia, Dept. M. Kansas City, Mo.

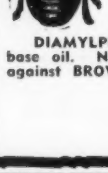
Established Money Saver for the PCO

Diamylphenol

•

BEDBUG, CARPET BEETLE AND DOG TICK SPRAY CONCENTRATE

•



DIAMYLPHENOL is a heavy oily liquid, substantially free of COLOR and free of ODOR. Diamylphenol is ECONOMICAL and has a QUICK kill.

DIAMYLPHENOL is miscible in oil base in all proportions. It is used as an odorless alternate material for phenol or cresol in bedbug sprays.

DIAMYLPHENOL is usually used at a dilution of 1-100 or 1% spray base oil. Numerous operators have reported good results using 1½% against BROWN DOG TICKS and CARPET BEETLES.

G. L. HOCKENYOS, Inc.
REISCH BLDG., SPRINGFIELD, ILL.

EXTERMINATORS CHEMICALS

RUMETAN ZINC PHOSPHIDE FOR RAT CONTROL

•

With thallium sulphate difficult to obtain, try RUMETAN . . . the ideal poison for Rats, Mice and Mole Crickets. Effective and economical. Write for details.

Pfaltz & Bauer, Inc.
EMPIRE STATE BUILDING, NEW YORK

cence does occur, it does not prove that it is urine. The reason is that oils, greases, and other substances may fluoresce in the same manner. Lubricating oils and greases made from mineral oil give a brilliant fluorescence even if present in stains not visible to the naked eye. For example, the floor may have oil stains or certain materials in cloth bags may have worked through to the surface or printing on paper bags is of such composition so that a similar fluorescence takes place. Where rodent pellets are found, fluorescent urine stains are nearby very frequently.

When fluorescence does occur, the next step is to test the area for the presence of rodent hairs. A simple method is to wipe the suspected area with a wet filter paper and then place the filter paper under a low power microscope to observe these hairs. In many cases, rodent hairs are found near or with the urine, probably deposited there by the mechanical contact of the rodents.

To establish the fact definitely that the fluorescence was caused by rodent or other animal urine, it will be necessary to make a chemical test for urea. Also to prove definitely that the hairs are those of a rodent, rather than those of a domestic animal, further techniques will need to be employed. As these examinations are highly technical, they should be pursued by trained laboratory personnel. Some experience by the operator will be required to make these initial detections and become familiar with the apparatus. Other uses of ultra-violet light will probably be discovered in rodent work as further experience and studies progress.

Thus, the value of this ultra-violet light is to give a lead. If the suspected spots or stains show no fluorescence, the contamination by rats or mice is excluded. If they do fluoresce, further confirmatory studies are required.

REFERENCES

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Pringsheim, P. and Vogel, M. Luminescence. Interscience Publishers, N. Y. 1943.

The mention of manufacturers and products implies no endorsement by the U. S. Fish and Wildlife Service, of the firms listed nor of the quality of their products.

Acknowledgment is made to C. S. Brinton, U. S. Food and Drug Administration, for helpful suggestions in preparing this article.

Six Guilty in Termite Fraud

Through the efforts of the Indiana State Police, six men were arrested March 4 for receiving money under false pretenses at Connersville, Indiana. They convinced an elderly man, William R. Green, that termites were damaging his home and proceeded to treat, receiving checks amounting to $513.54. Later they received a check for additional treating amounting to $763.60, but becoming suspicious, payment on this check was stopped.

All pleaded guilty to charges of obtaining money under false pretense and were sentenced April 5 by Judge G. A. Golden. Donald E. Malone, Raymond Gill, and Jack Amber were each fined $10.00 and costs and sentenced to four months at the penal farm. Artie Ellis, Moine Yost, and Ralph Parks were likewise fined $10.00 and costs and sentenced to three months at the penal farm. In addition, they repaid Mr. Green the amount received from him.

Malone gave his address as Huntington, Indiana, while the others indicated Wabash, Indiana, as their home. To our knowledge four of these men have been involved in fraudulent termite work in Indiana and Illinois. For a number of years Wabash has been the headquarters of many persons who have taken thousands of dollars from unsuspecting citizens in Indiana and Illinois, and possibly other states, for fraudulent termite work. It is interesting to note that all of the six men referred to indicated "Tree Trimmer" or "Tree Surgeon" as their occupation.

To Advertise and How? II

By WILLIAM REA

This is the second of a series of articles by Mr. Rea, the first having appeared in the January (1944) issue of Pests. Mr. Rea has had a long experience in advertising, having served as copy chief for two of the larger advertising agencies in the U. S., and currently heads an agency bearing his own name in the City of N. Y., which services, among others, an important industry supplier of insecticides. Moreover, he has lectured on the subject at Columbia University and the Pace Institute of Business, both of N. Y. —Ed.

IN AN EARLIER article, we stressed the importance of the headline, if only because you must depend upon it to stop the casual reader of the publication and win his attention. He bought the magazine for the features, editorials, comics or to read some special article —in fact for almost anything except to look for your advertisement.

So, if you'd like him to pause at your page and read your message, you'd better begin with a headline aimed to score a bullseye on his interest. Strange though it seems, there are an amazing number of folks who still cherish the idea that the art of creating advertisements consists mainly of an ability to write "something clever and catchy".

This discussion is intended to deal with advertising for the normal purpose of building sales, as distinguished from the current crop of wartime ads largely aimed to boost the buying of war bonds, get donations for the Red Cross and blood bank and otherwise to help the war effort.

If you have access to magazines of pre-Pearl Harbor vintage, glance through the headlines. You'll find that almost all of them are built around certain types of appeal to human interest. And you'll find further that those which arouse **your** interest invariably fall into one or more of four groups. These four major advertising appeals are: NEWS—PROMISE—CHALLENGE—CURIOSITY.

Let's take the first. The NEWS must, of course, be directly or indirectly concerned with the interests of the reader. The announcement that Olaf Attu has broken his leg will be shrugged off with "So WHAT?"—unless, of course, Olaf happens to be a celebrity. But the department store's headline: "Springs are Back" is NEWS that will grip the interest of a lot of people who are presently in need of new furniture or of having their old furniture overhauled.

For some time past, Mrs. John Q. Public has been unable to buy new furniture equipped with springs and the word that it is now again available is likely to stop her and make her read on to see if the advertising message offers something that may prove to her advantage.

GAINE'S Dog Food announces "His Meat Problem Licked for Good!" The accompanying picture of a happy-looking spaniel makes clear who "his" refers to. This is a combination of NEWS and PROMISE. Fido's owner, hard put to keep his pet supplied with meat in these days of rationing is apt to read on into the copy, because the headline suggests NEWS and PROMISES an "out" from his canine feed problem.

"Better Pest Control—with Fewer Fumigations"—addressed to the industrial plant owner — combines PROMISE with inducement to read on and learn something of possible advantage. Why? Because it deals

SOME IMMEDIATE ANSWERS TO YOUR SUPPLY PROBLEM!

Super Fluorex V (White and Tinted)
Fluorides
Thallium Poison Seeds
Bedbug Sprays and Concentrates
*Pyrofine—(Insecticide Concentrate)
*Blendum Powder—(Replacement for Pyrethrum Mixing Powder)
*Pyrethrum B.G. Powder Insecticide
Red Squill Powder and Extract
Roach Powder
Sterilan Mothproofing Powder

Supply limited; order promptly!

*No priority required.

AMERICAN FLUORIDE CORPORATION
151 WEST 19th STREET NEW YORK 11, N. Y.

Red Squill Baits in Pellet Form
Original Formula
5 ASSORTED BAITS FOR VARIETY
• CONVENIENT TO USE
• GIVES RESULTS
Send for FREE Trial Offer-Find Out!
FARM PRODUCTS CO.
Box 218~Bismarck, Mo.

MICE-GLUE

GETS MICE LIKE FLYPAPER GETS FLIES

10 lbs. $6.00 25 lbs. $13.50 100 lbs. $45.00

BIRD-REPELLENT

Keeps Pigeons, Starlings and Other Birds from Buildings

10 lbs. $6.00 25 lbs. $13.50 100 lbs. $45.00

PHOSPHORUS-PASTE

For Rats, Mice and the Large Brown and Black Roaches

10 lbs. $4.25 25 lbs. $9.00 100 lbs. $32.50

PEST CONTROL CHEMICALS CO.

324 Broadway Write for Details BUFFALO, N. Y.

Established Money Saver for the PCO

DIHEXOL

AN OIL SOLUBLE FABRIC PEST SPRAY

DIHEXOL is Dicyclohexylamine oleate, a thick oily liquid that solidifies a little below room temperature. It has some odor in the concentrated form, but no odor in the diluted form. Tests backed by seven years of actual use show that when used at a concentration of 2½% in an appropriate oil base, and when fabric is thoroughly wetted with it—the fabric will under all ordinary circumstances be repellant to moths and carpet beetles for a period of at least one year. This product is a repellant, and if it is desired to increase the contact killing effect of the oil (2-4 oz. per gallon) of Paradichlorbenzene may be added.

G. L. HOCKENYOS, Inc.

REISCH BLDG., SPRINGFIELD, ILL.

NOW YOU CAN BUY

4 to 1 Concentrate

FOR RATS AND MICE

(Just Dilute With Water)

Per-Mo Rat and Mice Liquid can be used as a drink or can be mixed with any food and used as a bait.

ECONOMICAL TO USE

Send $1.00 for a 16-oz. Bottle CONCENTRATE RAT & MICE LIQUID. Postage Prepaid.

PER-MO MOTHPROOF CO.

3729 Virginia Ave. Dept. R Kansas City, Mo.

PHOSPHOROUS PASTE 2 to 3%

Available

We are in a position to furnish Phosphorous Paste in bulk or small packages for resale.

Write for free sample and quotations.

WISCONSIN PHARMACAL CO.

217 N. Water St., Milwaukee 2, Wis.

Manufacturers of Phosphorous Paste for over 40 years.

directly with one of the reader's problems and hints possible escape or at least mitigation.

Now CHALLENGE: VITAMINS Plus headline "Do you STAND OUT in the crowd?" is aided and abetted by a picture of a lady who certainly does just that. Good? Yes indeed. What woman doesn't want to stand out in the crowd—isn't eager to learn how she may do so? (unless she is already happily of the type that **does.)**

Here's something to bear in mind. The best type of headline seldom makes a complete statement, seldom gives the reader a chance to mentally respond: Okay—I'm glad to KNOW that! Rather does it raise an issue, to settle which the reader must read on into the copy. The VITAMIN Plus headline does this.

Also, the good headline is usually teamed up with a picture that cooperates for brevity and clarity. One of the best I've seen was that of a life insurance company. Pictured was a bank interior—the line of tellers' windows. Approaching one marked Paying Teller, a line of four persons. No. 1, well dressed and conservative looking, obviously a doctor; behind him, wearing a white apron, a tradesman who has stepped in from his adjacent store to make a deposit; No. 3, austerely attired and rather lugubrious of expression, couldn't be anything but an undertaker and . . . last in line, a lady in widow's weeds. The headline read: The Widow waits at the END of the Line.

What husband, arrested by that dramatic line, wouldn't mentally reflect: Well—if anything happens to me, I'd hate to think of my Mary having to take what's left of my modest estate after all the other claimants have been paid. I'll read this and see what it may have to offer **us.**

MISUNDERSTOOD—because your hair is Gray?—with a picture of a lady of, shall we say over 35, holds a challenge to thousands of women who may have had just that very experience. Equally important, it suggests sympathy and understanding of milady's problem. She is likely to read further with eagerness to learn how her anguish may be assuaged, her difficulty overcome and her popularity restored by using a bottle or two of Blacktop's Hirstute Color Restorer.

Listerine's "Often a Bridesmaid, never a Bride" struck a responsive chord in the heart of many a spinster wondering if and when her turn might come . . . and got her to read on to learn how Listerine might help her enter the bonds of holy matrimony.

Though possibly the weakest of the four, the CURIOSITY appeal sometimes does a good job, for example: General Electric's headline: The G. E. Sewing Machine Lamp that joined the Navy.

It's Sweet Smoke Taste has made it America's best liked bacon—should win plenty of housewives to look further and see what brand, and how come? Incidentally the curse of the superlative "best" is off, because an asterisk leads you to the down-below explanation that "VOTES—in a new nation-wide poll—show that Swift's Premium Bacon is far and away America's favorite."

What else can help you get your copy read? Here are three good and simple rules: Begin with the reader's known, which means something within the range of the reader's personal knowledge or experience. I once heard Bruce Barton say: When you want to board a moving street car (and are wise) you'll run a few steps with it before swinging aboard. Similarly, when you want to board a man's interest, walk a few steps with him on

Prepared to Kill?

Prentiss Pyrethrum Products with high **Pyrethrins** content are your best guarantee of dependable **Killing Power.**

Prove to yourselves that **Prentiss Pyrethrum Products** can be relied upon for **High Killing Power at a Minimum Cost.** Write for samples and prices on—

LET US HAVE YOUR INQUIRIES ON

PRENTISS'

Fortified, Activated, Standardized

RED SQUILL POWDER

Write us for information concerning our **SPECIAL POWDER** which may be used in combination with SODIUM FLUORIDE as a contact insecticide.

R. J. PRENTISS & CO., INC.

80 JOHN STREET NEW YORK

One of the few ANT CONTROLS that still contains

THALLIUM SULPHATE

TAT

TRADE MARK

ANT TRAPS . . .
for destroying house ants

ANT BAIT . . . . .
for destroying garden ants

Thallium Sulphate, the only *tasteless* and *odorless* poison known, is the world's finest medium of ant control. Don't risk using substitutes that do *not* work.

Exterminators who want to use their own brand names can buy ANT TRAPS *UNLABELLED. Act fast*—because America's supply of Thallium Sulphate is limited!

SOILICIDE LABORATORIES

51 JAMES STREET MONTCLAIR, N. J.

something in which he is interested before you start trying to sell him what you want to unload.

Next: Keep your opening paragraph short and so phrase it that at its end your reader will be in agreement, hence disposed to continue. No good salesman opens his approach with an argument.

Example: If you have ever known the helpless feeling that comes when your car skids out of control, then you know the importance of keeping your car equipped with good nonskid treads.

This opening paragraph (when new tires were available to all) follows the rules listed. It begins with the "reader's known" since probably every automobile driver has known the dismay that goes with a bad skid. It is reasonably short, so looks easy to read—and it leaves the reader in complete agreement, hence disposed to read further and learn something to his possible advantage.

While it is particularly important to begin with a short paragraph, it is hardly less so to use short sentences and paragraphs throughout your copy. Such sentences permit the reader brief mental pause and a chance to assimilate one idea before proceeding to the next. And short paragraphs make your advertisement look easy to read, hence more inviting. In case you ask me to be more specific as to what I mean by "short"—it is well to aim for sentences of 15 to 25 words and paragraphs of 3 to 5 lines. Of course these figures must not be considered arbitrary and inflexible.

The editorial page of your good newspaper usually deals in lengthy paragraphs. But the editor is appealing to intellect. The intelligent reader will make the mental effort required to read the editorial because he is in quest of information or opinion. The average reader of advertising is governed more by emotion than by intellect and can seldom be counted upon to make the mental effort required to plunge into long paragraph copy.

Remember again—he didn't buy the publication to read your ad, so you must make it so inviting, so easy to read and so definitely interesting to him in terms of his problem and how it may be solved, that you have at least a chance of diverting some of his attention from the articles, features, editorials which he paid his money to get and which compete with your message for his interest.

Censored Article Forces Recall of 'AMA Journal'

The War Department last week ordered the recall of the April 22 issue of the weekly **Journal of the American Medical Association** because of an article it contained on a new insecticide that is subject to censorship, after an unrevealed number of copies had been placed in the mail and delivered. The **Journal** has a circulation in excess of 107,000.

Letters, signed by Dr. Olin West, secretary and general manager of the AMA, were sent immediately to subscribers after receipt of the War Department's order, asking them to return their copies at once and promising that "a revised issue will be mailed immediately upon receipt of your copy."

Telegrams were dispatched to recipients of the association's weekly clip sheet, "American Medical Association News," advising them that the article "cannot be used under any circumstances," and requesting them to destroy the item.

Notice

We are glad to print personal items of interest. Send us interesting or newsy items about yourself or your family. This magazine is for the pest control industry, and news about YOU is interesting to the rest of us.

WHAT'S NEW IN PEST CONTROL-PERSONALS

OUR CONDOLENCES to Harry S. Lewis, Rose Exterminator Co., Buffalo, N. Y., who lost his brother Jack recently.

The Glass Exterminating Co. (Exterminators).

Best Way Exterminating Co. (Termite Control).

White Fox Co. (Janitor Supplies).

All Exterminating Products Co. (Exterminating Supplies).

These four firms are now located at 2403 Mermaid Ave., Brooklyn, New York. An entire 4-story brick building is to be the home for the above firms, each specializing in their own line.

BUGS, NOISES AND JAPS VS. AMERICAN DOUGHBOY

Sharing with the Jap enemy the hatred of the front-line soldier on Bougainville are the bugs, noises and a hundred kinds of other creepies and crawflies, according to a cable received by the Chicago Times from its staff correspondent, Keith Wheeler, stationed on the island.

A man, says Wheeler, lost in these boondocks, is almost sure to be starved. The jungle offers no foods. Its only denizens, lizards, large and small, unaccounted varieties of insects, loud-voiced tree frogs that make the night hideous with their noise, white cockatoos, that bray howlingly throughout the daylight, and uncounted representatives of the insect kingdom.

And every winged or creeping bug on Bougainville, continues Wheeler, loves human flesh. No clothing seems to keep them out and those which miss you during the day lie in wait under your mosquito net and ambush you at night.

Within hours your skin becomes peppered with itching lumps which, after scratching, become open sores.

Strangely, all this biting produces very little malaria and almost no moo moo (the primary stage of elephantiasis). The only really dangerous gnawing done by the Bougainville bugs is that by centipedes and scorpions, which grow here in the heavyweight class.

One good chew from a centipede in fighting trim will put a man in the hospital for three days and frequently does. You find them everywhere, particularly in your bunk, says Wheeler.

BEDBUG NOT A COMMODITY: While making the rounds in Washington recently, Earl Wilson, columnist for the N. Y. Post, reported the OPA is practically fearless and let him listen in to people making inquiries. This is what he overheard:

"Hello, hello," said one indignant woman, "I want the OPA to get rid of my bedbugs!"

A pretty young girl named Wanda Roe of Memphis was on the phone. "Call your board of health," she said.

"They said the OPA now has charge of bedbugs!" the woman snapped.

"I read all our bulletins and I'm sure the OPA doesn't have charge of bedbugs," said Miss Roe, stubbornly.

Feeling that maybe the OPA did really have charge of bedbugs but was just keeping Miss Roe in the dark, Mr. Wilson investigated, and it DOESN'T have charge of bedbugs, nor roaches, ants or body lice, either. You see, extermination service is exempt from price control, because it is not connected with a commodity.

"A bedbug," the man explained to Wilson, "is not a commodity!"

RESPONSE OF RATS MAINTAINED ON DIETS FUMIGATED WITH METHYL BROMIDE, by H. C. Spencer, V. K. Rowe, E. M. Adams, and D. D. Irish. Biochemical Research Laboratory, The Dow Chemical Co., Midland, Mich.

Conclusions: Rats maintained for one year on diets fumigated with two and six pounds of methyl bromide per 1,000 cubic feet and having an average bromide content of 26.2 and 63.7 milligrams per 100 grams, respectively, made normal weight gains. These rats showed no evidence of intoxication or nutritional deficiency as determined by hematological, histopathological, analytical, and organ-weight studies. Similar results were obtained with rats fed a diet containing 0.1 per cent sodium bromide.

Since it has been shown that rats can be maintained for one year on diets fumigated with two and six pounds of methyl bromide per 1,000 cubic feet with the production of no discernible ill effects, it is concluded that foodstuffs, fumigated with the usual commercial concentrations of one to two pounds of methyl bromide per 1,000 cubic feet and properly aerated, will contain no residues which might have a deleterious effect, even when such fumigated foods are included as a large part of the human dietary.
(*Food Research*, 1944, *Vol.* 9, *No.* 1, *pages* 11-18.)

DESCRIBING "LONDON AFTER YEARS OF BOMBING", in an article of the same title, in the N. Y. Herald-Tribune, Joseph Driscoll reports, among other things: "The ability of the English to laugh at the Germans must be the most terrifying weapon that Hitler and his gang have faced thus far. . . . It may be a total war for Hitler, but John Bull always manages to reserve a little energy for his normal peacetime pursuits.

For instance, in the Chelsea Borough of London, which has had its full share of blitzing I came upon an official notice which read simply and to the point: 'Rat menace in borough. Will rat reporters please drop their rat reports in rat reporters' box?'

(Conceding that Hitler is a rat and a bigone, the English never forget that other rats are about and must be taken care of.)"

NOW - WE'VE - SEEN - ALL DEPT.—A New York store, advertising in the newspapers its fur storage facilities, rhapsodizes: "Oh-h-h-h, Mairzy doats but mothzeat coats 'n' mothsull nibble foxes—a moth'll-munch sable too, wouldn't you?"

(Continued on Page 34)

KATFISH BRAND TERMITE HOSE!

AMERICA'S FINEST

FOR 15 YEARS

GUARANTEED TO OUTWEAR AND OUTLAST ANY OTHER HOSE OR MONEY REFUNDED

WHY BUY DATA

★ A 15-Year Proved Product

★ Built for the Job Exclusively

★ GUARANTEED with 42 Years Behind It

★ Years of Use Is Wise Economy

Write Today for Prices and — FREE SAMPLE
Also Rock Wool Hose and Cyanide Hose

"The Rubber House of the Americas"

BROADWAY RUBBER MFG. CO.
529 East Broadway Louisville, Ky.

Poison Is Her Business—But She's Lovely, Not Deadly

By BERTHA WELLMAN

Originally appearing in the Cleveland Press the article which follows emphasizes the human interest that oft-times attaches to the activities of the pest control profession. As if her adult accomplishments weren't already more than ample for one so scant of years, Miss Laing, we understand, has undertaken a course in Public Speaking at Cleveland College, as well. This means, one may hope, that she will grace the speakers' platform of an NPCA convention, in the not too distant future, with her eye-filling presence and a mind-stimulating talk.—Ed.

Deadly hydrocyanic gas fails to frighten beautiful Barbara Ann Laing, general manager of the Laing Exterminating Co. and a professional model in her spare time.

When her father died two years ago Miss Laing took over his business and also one of his favorite mottos: "Never ask anyone to do anything you can't do for yourself."

For her it often means donning a gas mask in case of emergency and boarding a Great Lakes freighter to help fumigate the ship and rid it of rats, roaches and other insect pests. The hydrocyanic gas used is so lethal that although they wear gas masks fumigators never work on a job alone.

Tall and slim with jet black hair and green eyes, Miss Laing looks more like a movie star or a model than a business woman. She's smartly dressed, with elegantly long polished fingernails, but she talks in a quiet, precise way which betrays the fact that she probably is also a smart, cool-headed business woman.

Fumigate Hospitals, War Plants

Besides fumigating most of the Great Lakes freighters on 24-hour notice anywhere between Buffalo and Detroit, the Laing Co. is called on to do work for many hotels, restaurants, railroads, private homes, hospitals, dairies and war plants.

"I was very fond of my father and it was hard to study after he died," Miss Laing said, "but I had to pass examinations to run the business." She had to take a city fumigator's examination and then a master's examination, but today Miss Laing is one of the members of the Cleveland Fumigant Board.

"My sister swears I'll be an old maid," she added smiling, "but I like things done right." So Miss Laing went ahead and learned enough about insects to become an entymologist, and as much about poisons as a chemist. She had to be able to identify any kind of an insect, she had to learn antidotes to all poisons, first aid and city rules and ordinances for fumigating.

Miss Laing has been chosen as the model for a new perfume and when it is introduced in the fall her picture is scheduled to appear in Harper's Bazaar and other style publications.

Just a Hobby

"Modeling is just a hobby," Miss Laing insists. "I could have had a job with John Powers several years ago, but I figured although it might be glamorous it would certainly be temporary and there really isn't much common sense to it."

Farming is Miss Laing's other hobby. Every week-end she forgets about both hydrocyanic gas and modeling and goes out to a farm in Bedford owned by relatives. "Oh, yes, I love to pitch hay and drive the team and help with the farm work," she said laughing. Her father was born on a farm on the site of the first Jack & Heintz plant in Bedford.

Miss Laing's mother, Mrs. Robert W. Laing, is owner of the Laing Co., which is at 7700 Carnegie avenue, although she is no longer active in the business. Her sister, Helen Laing, is a well known Cleveland singer. The family lives at 2196 Bellfield, Cleveland Heights.

Answers to Multiple Choice Questions

1. Crustacea
2. Eight
3. Six
4. No
5. Spiders
6. Three
7. Three
8. 80,000
9. No
10. Cockroaches
11. Coleoptera
12. Meal Worm
13. Hemiptera
14. Orthoptera
15. Siphonaptera
16. Coleoptera
17. Thysanura
18. Isoptera
19. Hymenoptera
20. Corrodentia
21. (5)
22. (2)
23. (10)
24. (3)
25. (7)

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FOR

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WRITE FOR FOLDER TODAY

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured By The Solvay Process Company

40 RECTOR STREET NEW YORK, N. Y.

Let's take a look at...

PYRETHRUM

1944—and After

THERE is no faint possibility that the present year will see the household insecticide industry re-introduced to pyrethrum. Available supplies are urgently needed for mosquito control in combat areas, and one need not have access to the files of the General Staff to predict increasing military activity in some of the worst malarial regions of the world.

It is even more certain, however, that the plantings now being encouraged to meet military requirements will go on flowering profusely after the guns are silent. The long-range view promises adequate and even ample supplies at reasonable costs.

Fortunately, substitutes have been available to carry through what might easily have been a disastrous period for the industry and its customers, but none yet has challenged pyrethrum's two great advantages—toxicity to a wide variety of insects, and safety to men and animals.

D.O ESTABLISHED 1798

DODGE & OLCOTT COMPANY

180 VARICK STREET • NEW YORK 14, N. Y.

BOSTON - CHICAGO - PHILADELPHIA - ST. LOUIS - LOS ANGELES

Plant and Laboratories . . . Bayonne, N. J.

WRITE FOR THESE BOOKLETS

The latest helpful information service literature will be sent to you without cost or obligation. If, in addition, there are any particular pieces of literature offered by advertisers in this issue you are interested in receiving, either write them direct, or if you prefer, please send us such requests.

Please note, however, that you must request each booklet on a separate letterhead though they may all be mailed in one envelope addressed to Pests, 126 Lexington Avenue, New York City, N. Y.

SPECIAL ROACH POWDER

Circular describes a roach powder (containing Lethane A 70) which, it is stated, is fast acting, positive in kill and will not deteriorate for at least eight weeks after application. As a result, the supplier points out, the PCO does not have to service his customers as often, thereby conserving manpower. Moreover, it is stated, the powder is non-toxic to warm-blooded animals and may, therefore, be used in dairies, packing and food handling plants, homes, etc., in fact, in all places where sodium fluoride mixtures may not be used. . . . Described also is a sodium fluoride-Pyrane formulation for the PCO who wishes to make his own roach powder.

WRITE PESTS—Bosley.

SODIUM SILICO FLUORIDE

Bulletin describes sodium silico fluoride product with proper density. Effective manner of testing for presence of HCN after ventilation also discussed.

WRITE PESTS—AC 70.

MILITARY FUMIGATION MANUAL

This special 48 page manual has been prepared for the benefit of officers and civilians in the Armed Forces who are responsible for vermin control, and for PCOs who may contract with the Armed Forces for fumigating work. Among other subjects, the manual discusses: dosage, preparation of building for fumigation, fumigation operation, common pests, cockroach control; precautions, first aid methods, etc.

WRITE PESTS—AC.

TERMITE CONTROL

Folder discusses concentrates available for two distinct methods of termite control: (1) treatment of timbers in place with an oil solution, and (2) treatment of all soil around an infested building or area with either an oil or water soluble chemical. Issuing company states it specializes in all problems concerning wood-destroying organisms and also wood preservation and invites your inquiries thereto.

WRITE PESTS—WOOD.

FUMIGATION SAFETY SUGGESTIONS

Of timely interest, in view of the at-hand fumigation season, is this bulletin which advocates as a safety measure the use of methyl orange-mercuric chloride test papers for the presence of HCN. It also discusses can openers for Zyklon Discoids, the need for adequate ventilation after fumigations, and gives a cautionary note on pilot lights in premises to be fumigated.

WRITE PESTS—AMERICAN.

STERILIZING GAS MASKS

News bulletin describes a chemical that is claimed by the manufacturer to be effective in sterilization of gas masks. Bulletin also discusses antidotes and first aid, particularly an inhalant which functions best as an antidote to HCN poisoning, and where obtainable.

WRITE PESTS—A-C-73

FUMIGATION AND PLASTICS

News release discusses use-co-ordination of such diverse chemical products as plastics and fumigants in connection with infested bagged grain, seed, packaged or boxed foodstuffs. Methyl bromide-plastic-tarpaulin method of disinfestation described.

WRITE PESTS—DOW

HOUSEHOLD SPRAY FACTS

Manufacturer's bulletin discusses Lethane's killing power, range of insect control, cost, chemical stability, spray formulas, etc.

WRITE PESTS—ROHM & HAAS.

PYRETHRUM - DERRIS - RED SQUILL PRODUCTS

Leaflet describes foregoing insecticides with special bait chart for use in connection with powdered red squill.

WRITE PESTS—PRENTISS.

SOLVAY PRODUCTS

48-page booklet in colors and illustrated, covering their entire line of Alkalies and Special Products, with a special section dealing with Para-Dichlorobenzene and Ortho-Dichlorobenzene.

FREE COPY MAY BE HAD BY PEST CONTROL OPERATORS. WRITE SOLVAY, c/o PESTS.

DEODORANT

Catalog includes price data, etc., on deodorant which it is felt can neutralize and deodorize such toxic agents as Thanite, Lethane 384 Special, Velsicol, etc. Also contains data on perfume oils for sprays made with pyrethrum and kerosene.

WRITE PESTS—MAGNUS.

FUMIGATION NOTES:

Discusses spread of Discoids; reinfestation; effects on vegetables and eggs.

WRITE PESTS, AC58.

ELECTRIC FANS

Bulletin discusses value of electric fans in connection with fumigation work, also some pertinent thoughts on the Schafer Prone Pressure Method of Resuscitation, etc.

WRITE PESTS—AC-69.

MOLE KILLER PELLETS

Circular describes mole killer pellets which manufacturer states requires no traps, no gas, no exposed poison. Diagram of runways and explains how mole lives. Testimonial letters.

WRITE PESTS—CARAJON.

PRESERVATION OF MILLWORK AND OTHER DRY WOOD PRODUCTS

Bulletin discusses composition of Permatox B Concentrate and its application in the preservation of millwork and other dry wood products.

WRITE PESTS—Permatox 43-B.

INSECT COLLECTIONS

Booklet describes pocket display case which may slip easily into a coat pocket making it of value for salesmen or others who travel about. Life history collections of structural type pests are also available for the PCO.

WRITE PESTS—Ward's.

SAFETY IN FUMIGATION WORK

Fumigation Safety Rule No. 1; namely, "Vacate entire building even though only part is fumigated, as well as adjoining buildings into which gas may penetrate" is discussed in this bulletin.

WRITE PESTS—AC No. 78.

PIGEON-PROOFING

Folder describes pigeon-proofing invention which manufacturer claims will completely and decisively eliminate the pigeon nuisance. In use by real estate companies, churches, government buildings, etc.

WRITE PESTS—STANLEY.

CONTROL OF TERMITES-POWDER-POST (LYCTUS) BEETLES-DECAY

Circular discusses properties and uses of Permatox A in termite control and its application to soil and wood to control termites, decay control, powder-post beetle prevention and control. Description of Permatox T and its uses in termite control, as a soil poison, are also discussed, together with toxicity.

WRITE PESTS—BULLETIN 43-T.

BOX CAR FUMIGATION

Folder describes box car fumigation with methyl bromide, giving details as to: car seal, applicator arrangement, methyl bromide application, dosage, exposure period, temperature, aeration, precautions.

WRITE PESTS—DOW

Hydrocyanic Acid Poisoning—Skin Absorption

Bulletin discusses some pertinent safety suggestions with respect to avoidance of hydrocyanic acid poisoning through skin absorption.

WRITE PESTS A-C-74

BIRD REPELLENT

Circular describes product which manufacturer claims will serve as an effective repellent against pigeons, starlings, bats, dogs, cats, rats, mice, woodchucks, moles as well as crawling and flying insects that prey upon plantings and seedlings.

WRITE PESTS—PX

THE ACTIVATING EFFORT OF PYRETHRUM UPON THE GERMAN COCKROACH

Research material prepared by John M. Hutzel, of the Ohio State University, Columbus, Ohio in cooperation with the Kenya Pyrethrum Extension Service, Inc., N. Y. Supervised by Professor F. L. Campbell.

WRITE PESTS—PYRETHRUM.

NEW ANT TRAP

Manufacturer claims many new features such as no turning or twisting necessary; four openings; larger trap; contents ½ greater than any other competitive brand.

WRITE FOR YOUR FREE SAMPLE OF ANT TRAP TO NOTT, c/o PESTS.

PRESERVATION OF LUMBER, POLES, POSTS, PLYWOOD WITH PENTACHLORPHENOL

This bulletin gives a brief summary of the properties, use to date, and recommendations for the preservative treatment of lumber, poles, posts, and other forest products with Permatox A. This product, it is stated, has shown outstanding promise as an effec-

tive and permanent oil preservative for many wood products. Set forth briefly also, are recommendations for the effective preservative treatment of lumber, poles, posts, and other forest products with Permatox A, based upon experience to date.
WRITE PESTS—BULLETIN 43-A.

FUMIGATION SAFETY RULE

Bulletin discusses importance of personal inspection of entire premises immediately before releasing gas, and offers some constructive suggestions with respect thereto.
WRITE PESTS—A C 81.

RESPONSE OF RATS MAINTAINED ON DIETS FUMIGATED WITH METHYL BROMIDE

Research material reprinted from Food Research.
WRITE PESTS—DOW-RESEARCH.

CALCIUM CYANIDE FOR RAT CONTROL

36-page booklet contains excerpts from official publications and reports of health officers throughout the world regarding use of calcium cyanide in the control of rats. The widely differing conditions surrounding infestations, and the specific types of control for each, which are described, will serve as suggestions to health officers and others in solving similar problems.
WRITE PESTS.

FUMIGATION SAFETY RULES

Bulletin discusses fumigation safety rules with respect to mattresses, pillows, bedding, clothing and bedroom rugs, etc.
WRITE PESTS—AC No. 79.

FUMIGATION SAFETY RULE

A review of fumigation accidents of record for 1943 shows that oversight or disregard of rule to lock all doors and accessible windows, failure to place warning signs thereon and failure to post guard during fumigation account for approximately 20% of the accidents. Bulletin discusses ways and means to eliminate accidents of this nature.
WRITE PESTS—AC No. 80.

DOG-CHECK

Circular describes remedy which manufacturers claims is effective for breaking dogs and cats of their undesirable habits, that rain will not wash it off, odor will last for three weeks and can be sprayed directly on new growth. Free sample if you write on your letterhead.
WRITE PESTS—NOTT CO.

Fumigation manual. 76-page manual describes safe handling and working with "Cyanegg" and on fumigation procedure and insect control. Illustrated.
WRITE PESTS—DuPONT .

INSECT TRAPS

Bulletins describe traps for ants and roaches, with suggestions for their use.
WRITE PESTS—SOILICIDE.

The Texas Gulf Sulphur Co. has recently published a revised copy of The Use of SULPHUR in the CONTROL of TRUCK CROP and CANE FRUIT INSECTS and DISEASES. Any desiring a copy of this booklet which is for free distribution, can obtain it by writing to The Texas GULF SULPHUR Co., Second National Bank Bldg., Houston 2, Texas.

Desire 1 or 2 lbs. of THALLIUM SULPHATE. This would be appreciated very much. Name your price. BOX 23, c/o PESTS.

LOCAL ORGANIZATION NEWS

New Jersey Pest Control Association

The largest meeting of the N. J. Pest Control Association, Inc. was held April 13, 1944 at Newark, N. J. and was attended by many public officials representing several cities and municipalities in New Jersey. Practically the entire membership also attended.

For the past few months, the activities of the Association have attracted wide attention by legislative bodies and other public officers throughout the State. Having sponsored educational and legislative programs for the improvement of the industry, the respect and confidence of the public was gained. The Legislative Committee of the Association recently prepared a Bill to regulate fumigating in one of the larger cities of New Jersey and considerable publicity was given it by the newspapers. After careful consideration and deliberation, the City Commission adopted the measure and it has been enacted as a city ordinance.

The program of the meeting was well balanced and appealed to the large audience which indicated its approval by lively applause. The first speaker was Dr. George H. Chapman of the American Cyanamid & Chemical Corp. who discussed hydrocyanic acid gas. The public officials seemed eager to get authentic data and asked many interesting questions during the open forum. Dr. Chapman's time had to be extended considerably. After a brief intermission, Dr. Frank B. Maughan and Mr. W. H. Arendt, of Rohm & Haas Company, Phila., Pa. discussed synthetic insecticides. They illustrated their topic with colored slides. Having presented interesting data on fumigating and exterminating materials, it was appropriate that the safety factors be emphasized. Messrs. W. J. Alexander and E. C. Bohman of the Public Service Corp. of N. J. presented excellent motion pictures in Technicolor, depicting artificial respiration applied to victims of three types of accidents. This was a visual demonstration of the proper use of the Schafer Prone Method under actual conditions.

Among those in attendance were:
Capt. T. P. McGrath, Rescue Squad, Newark, N. J.
Capt. F. Klinzelberger, Rescue Squad, Newark, N. J.
Capt. F. F. Donovan, Fire Dept., Plainfield, N. J.
Mr. A. I. Littell, Board of Health, Plainfield, N. J.
Mr. T. Everett Ross, Board of Health, Plainfield, N. J.
Capt. J. V. Denney, Police Dept., Plainfield, N. J.
Chief Charles D. Burnett, Fire Dept., Newark, N. J.
Mr. Charles T. Foulk, Health Dept., Bloomfield, N. J.
Mr. Charles Demarest, Engineering Dept., Bloomfield, N. J.
Mr. A. V. Turner, Health Dept., Lyndhurst, N. J.
Capt. Herman Yahn, Fire Dept., Irvington, N. J.
Capt. Michael Walsh, Fire Dept., Irvington, N. J.
Mr. J. Carroll, Chief Inspector, Health Dept., Irvington, N. J.
Mr. W. Hill, Sanitary Inspector, Health Dept., Irvington, N. J.
Deputy Chief August Hoch, Police Dept., Irvington, N. J.
Mr. J. Lynch, Health Dept., Newark, N. J.
Mr. Chas. Tippert, Health Dept., Long Branch, N. J.
Mr. Geo. Seeley, Health Dept., Long Branch, N. J.
Mr. R. Fellers, Health Dept., Nutley, N. J.
Mr. J. Day, Health Dept., Nutley, N. J.
Mr. E. Gerner, Health Dept., Orange, N. J.
Mr. F. Turley, Health Dept., Elizabeth, N. J.
Mr. A. Field, Health Dept., Kearny, N. J.
Mr. A. Werrell, Sergeant, Police Dept., Irvington, N. J.
Chief William Holleran, Fire Dept., Irvington, N. J.
Deputy Chief H. V. Zizenfus, Fire Dept., Irvington, N. J.
Capt. Harold D. Boyland, Fire Dept., Irvington, N. J.
Lieut. Lamb, Fire Dept., Irvington, N. J.
Sgt. Detective M. Hozer, Police Dept., Cliffside Park, N. J.
Capt. D. O'Donnell, Fire Dept., Cliffside Park, N. J.
Dr. George H. Chapman, American Cyanamid & Chemical Corp.
Dr. Frank B. Maughan, Rohm & Haas Co., Philadelphia, Pa.
Mr. W. H. Arendts, Rohm & Haas Co., Philadelphia, Pa.
Mr. W. J. Alexander, Public Service Corp., N. J.
Mr. E. C. Bohman, Public Service Corp., N. J.
Mr. and Mrs. W. J. Boyce, Economy Ext. Co., Hightstown, N. J.
Mr. L. P. Reichel, Greystone Park, N. J.
Mr. H. Krauss, A. A. Abbay Ext. Co., Newark, N. J.
Mr. F. J. Bowers, Bowco Laboratories, Rahway, N. J.
Mr. T. Ramsey, Newark, N. J.
Mr. H. Stevens, Newark, N. J.
Mr. D. P. McAlindin, Royal Exterminators, Inc., Hoboken, N. J.
Mr. and Mrs. Murray Breecher, Federal Vermin Ext. Co., Jersey City, N. J.
Mr. Larry Breecher, Federal Vermin Ext. Co., Jersey City, N. J.
Mr. J. Gorman, Gorman Control Service, Newark, N. J.
Messrs. H. Hobelmann, (Sr. & Jr.), Mako Products Co., Maywood, N. J.
Mr. H. Kutakoff, Nu-Way Ext. Co., Newark, N. J.
Mr. J. Gazzani, Jr., Garfield, N. J.
Mrs. A. Charnack, Standard Ext. Co., Newark, N. J.
Mr. Wm. Waack, No. Jersey Termite Co., Bloomfield, N. J.
Mr. M. D. Bloomfield, Just Ext. Co., Bloomfield, N. J.
Mr. A. Blossfeld, Cliffside Park, N. J.
Mr. W. Roberts, Model Ext. Co., Cliffside Park, N. J.
Mr. J. Medoff, Hudson Ext. Co., West New York, N. J.
Mrs. J. Medoff, West New York, N. J.
Mrs. J. Geisman, Sanitary Ext. Co., Jersey City, N. J.
Mr. J. E. Sameth, Western Ext. Co., Newark, N. J.

Pest Control Operators of Washington, D. C.

Adoption of a survey card for rat inspections, together with a formal procedure in connection with the recommendations that will be submitted by the PCO so as to embody the necessity of cooperation that must

be given by occupants of premises with regard to sanitation and ratproofing in conjunction with the actual extermination procedures by way of baiting, gassing, trapping, shooting, as well as repellents, was the principal business transacted at the splendid meeting of the Pest Control Operators of Washington, D. C. on April 27, 1944. William D. Walton (Western Exterminating Co., Washington, D. C.), at whose office the meeting was held, presided.

In attendance and offering constructive guidance suggestions on procedure on several of the many problems confronting this industry locally was William O. Buettner.

The following firms and their representatives were present:

Exterminating & Control Service, J. S. Macaboy.
Termite Engineering Co., Ray Frederick.
Arlington Exterminators, Nathaniel Madden.
J. E. Gaskins, T. T. Boulware.
Exterminating & Chem. Service (Mt. Rainier), Lawrence Shaw.
Apex Exterminating Co., J. R. Byrne.
Silver Brothers, Napoleon D. Silver.
No Wonder Rat Ext. Co., William S. Church.
Owl Disinfectant Co., J. R. Fain.
American Disinfectant Co., P. Calvert Cissel.
Western Exterminating Co., William B. Walton.
J. E. Gaskins, J. E. Gaskins.

—Submitted by William B. Walton.

STANLEY'S PATENTED PIGEON-PROOFING

Economically, Permanently, Positively and **Lawfully** from any type of structure.

Stanley's Roofing & Building Service, Inc.

523 West 184th St. New York, N. Y.

Telephone: WAdsworth 7-3300-1

WIZO RAT GLUE BOARDS

Eliminate Use of Poison!

Require No Bait!

A practical and economical way to rid buildings of rodent pests! No hazards of poisoned bait . . . or of decomposition! Easy to prepare! Just place WIZO Rat Boards near rat hole or form a runway next to walls. Fasten boards to floor to prevent pulling away. Rodents are caught firmly the moment they step on the boards.

WIZO RAT GLUE can be obtained in quantities for preparing your own boards. Write for complete particulars.

ELKAY PRODUCTS CO.

323-27 West 16th St. New York, N. Y.

What's New In Pest Control - Personals

(Continued from Page 30)

COMMENTS FRED SEARING, COLUMNIST FOR A PHILADELPHIA PAPER, exterminators under contract have a way of shortening their visiting and working time through leaving some of their material for the hotel workers to do the job they are paid for. It is, of course, practical for them to leave some for emergencies, but it is also proper for them to do a full time job they are paid to do.

WEDDING BELLS RANG OUT RECENTLY FOR MORTON A. SWEIG, vice-president of the Exterminating Services Corp., N. Y. C., who was married to Miss Charlotte Phillips of the same city. Marriage was performed by the Rev. Dr. Israel Goldstein in his New York study. A reception and dinner took place at the Savoy-Plaza. The bride is a graduate of the Dalton School and Columbia University. Mr. Sweig attended New York Military Academy and the Franklin School, and was graduated from New York University. The couple will live at the Savoy-Plaza . . . **All good wishes and happiness to the newly married couple.**

NEIL M. FORSYTH, owner of the New England Bug Exterminating Co., Brookline, Mass., passed away on May 16. Our sincere sympathy and condolences to Mr. Forsyth's family. It is our understanding that Earl Meyers, who has been practically in charge of the company's operations for the past few years, will continue the business as heretofore.

DDT IS DEADLY TO HOUSEFLIES—Once the war is over a new and powerful insecticide with an almost unpronounceable chemical name but known as DDT will be available for use against man's age-old enemy, the common housefly.

DDT is as deadly against flies as is the bazooka against tanks—it stops them cold. It is not likely to become available for ordinary civilian uses until after the war. When peace comes, however, it should greatly reduce the nuisance and menace to health created by the presence of houseflies on farms and dairies and other establishments wheer they are a nuisance.

The secret of the new insecticide is that when sprayed on walls and ceilings it leaves an invisible deposit of a substance highly toxic to flies. Only a few minutes exposure to this material will cause death to flies in from 30 minutes to six hours. Even months afterwards flies lighting on the sprayed surfaces are quickly killed.

At the Department of Agriculture's Entomology and Plant Quarantine Laboratory at Orlando, Fla., test cages were treated with DDT at the rate of 100 milligrams per square foot of surface. As long as 150 days after application of the spray, flies exposed in these cages were killed within an hour.

In other tests one spraying of DDT in dairy barns reduced the fly populations 95 percent. The number of flies in the treated barns remained at the low level for four months as a result of the lasting lethal effects of the spray. In untreated barns, the fly population remained high during the entire test period.

BUILDING OWNERS TO MEET — The National Association of Building Owners and Managers announces that its thirty-seventh annual meeting will be held in Philadelphia June 19 to 22 inclusive. The building outlook in the post-war period, the rental situation and the reconversion of industrial properties for civilian uses will be among the topics for discussion. George H. Ostermayer is chairman of the convention committee.

The Banex Exterminating Co. has moved their office and factory to more spacious quarters—2425 Jerome Ave., New York City, 53.

THE BEST SOLUTION

I'm nearly distracted with ants in the house.
No pest could be worse, nor cockroach nor mouse.
There's paste on the drainboard and cups in the yard.
I've powdered the cupboard with greatest regard.
I follow directions in all that I do,
But the hoped for results simply do not come through.
If they don't yield to sticky paste,
Some other thing may suit their taste;
But what that other thing may be,
Has not yet been revealed to me.
But, oh, I know what I will do—
I'll call the ant man, tried and true,
And let him with his magic skill
Drive out the ants and send the bill!

—Robert E. Hackley.

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PYRETHRUM—"Efforts are being made in French Morocco to interest farmers in the planting of pyrethrum but some difficulty may be encountered in procuring seed from abroad, according to the Department of Commerce," declares Oil, Paint & Drug Reporter. It has been suggested in Morocco that about 2,500 acres should be planted. From statistics in Kenya and other areas, production would show about 500 tons annually or about 400 pounds per acre.

ANTS IN YOUR PLANTS—"The Connecticut Agricultural Experiment Station at New Haven wants gardeners—victory and flower—to know that the creature responsible for the presence of sap-sucking root aphids among their plants is the busy little ant," reports the N. Y. Herald-Tribune. The aphid is the ant's milk cow, so the ant pastures its herd in your garden, callously indifferent to the stunting effect upon your plants. The experiment station's solution is simple and harsh—kill the ants and there will be no more aphids.

Business Opportunities

(Classified)

RATES — For individuals seeking employment, 5c per word, minimum $1.00. All others 10c per word, minimum, $2.00. All advertisements must be in the hands of the publishers seven days before publication date and must be accompanied by cash or money order for payment in full. The publishers are not responsible for any false or misleading advertisements.

Replies to advertisements where box number only is indicated should be addressed c/o PESTS, 512 E. 14th St., Kansas City 6, Mo., giving box number as well.

Well established, profitable, Pest Control Service, with enviable reputation, for sale. Located in Lower Rio Grande Valley of Texas. Box 984. Pests.

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Both Methyl Bromide and Dow Chloropicrin meet warehouse needs. Chloropicrin will serve you well in buildings that cannot be thoroughly sealed.

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